

B lexsolar Thermal Ready-to-go

The **lexsolar-Thermal** kits explain the various technologies for renewable energy production using heat energy. Starting with the basics of solar energy, moving through the applications of solar collectors, the experiments extend to heat-pump technology. The **Thermal Ready-to-go** is both portable, in its handy aluminium carry-case, and comprehensive, due to the large number of included accessories. This kit is ideally suited for students aged 14-19 years.

The most important element is the solar collector, which can be powered either direct from the sun or by using the included infra-red light source. The solar collector converts radiant energy to heat, with water as the energy carrier, and consists of the following components:

- Special profile frame, with tapped holes for positioning either vertically or inclined
- Two removable glass windscreens which help to decrease energy loss via convection
- Blackened 6-helix Perspex coil with two ports for simple coupling
- Black/ White lacquered collector back (exchangeable)
- Styrofoam insulation board (also individually removable) with integrated thermometer

After about 30 minutes of irradiation, a water temperature difference of roughly 20°C (68°F) can be measured. As soon as the elevated tank is connected to the solar collector, using the included hose, a heat convection is caused in the water due to temperature/density differences and a heat circuit starts up.

With the heat exchanger, consisting of a copper pipe spiral inside a transparent plastic case, the heat energy can be transmitted from one liquid to another. The water flow through the spiral exchanger is powered by a circulating pump, which can be mounted on the collector.

Experiments:

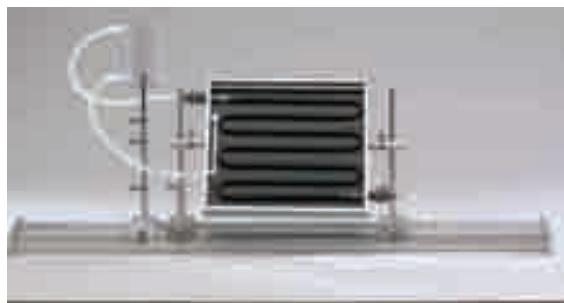
- Absorption of heat radiation
- Energy transfer through convection
- Principles of a solar collector
- Solar collector with thermo siphon circulator
- Solar collector with heat exchanger and pump circulator

Components:

- 2 x Erlenmeyer flasks, black and white, lacquered, with rubber stoppers and capillary tubes
- 1 x Heat convection tube
- 1 x Spirit burner
- 1 x Solar collector, 260 x 200mm (10.2 x 7.9 inches)
- 1 x Thermo siphon tank with hose
- 1 x Thermometer
- 1 x Manual
- 1 x Infrared light source with holder
- 1 x Stand, stage clamp, clamp and sleeves

Code: 502-042

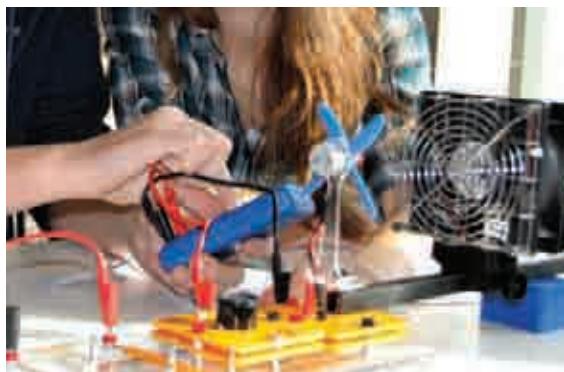
£1,595.00



Optional extra components to broaden experimental range:

1 x Multi-purpose rail/profile rail, 1 m/39.3 inches (502-046)





Components:

- 1 x Plastic box with hard-wearing foam insert
- 1 x Wind machine module
- 1 x Profile rail with moveable tab for the wind machine
- 1 x lexsolar base unit
- 1 x Potentiometer module
- 1 x LED module
- 1 x Capacitor module (0.1F)
- 1 x Wind turbine with adjustable blades
- 1 x Wind turbine, 4-bladed
- 1 x Wind turbine, 3-bladed
- 1 x Wind turbine, 2-bladed
- 1 x Savonius rotor

Extra components required:

- 2 x Digital multimeter (614-014)
- 1 x Power supply, 4 - 12V DC (605-016)
- 2 x Test leads, black, 50cm (17-0385)
- 2 x Test leads, red, 50cm (17-0380)

Optional extra components to broaden experimental range:

Measurements without Meters extension set (502-017)

A lexsolar Wind Advanced

The **lexsolar-Wind** range conveys an excellent understanding of the key concepts involved in wind energy, along with the practical applications.

This system teaches all the key fundamentals of wind energy. With the help of curriculum based trials it covers the different topics necessary for understanding the functioning of wind power plants.

Qualitative experiments for students aged 11-13 years, and complete quantitative trials for physics lessons up to the age of 19, are explored and explained in detail.

For the qualitative experiments the extension module 'Measurements without Meters' (502-017) is required.

Experiments:

Dependence of the wind power plant on wind speed

- Phenomenological with light bulb (only with the extension module 'Measurements without Meters')
- Through measuring the voltage at the generator
- Through determining the power output of the generator using a constant resistance

N.B. For the quantitative determination of the wind speed the anemometer extension (614-015) is required. Otherwise the wind speed can only be determined using given calibration curves

Variation of the generated voltage while connected to an energy consumer

- With resistance
- With the energy consumers: buzzer, engine and light bulb (only with the extension 'Measurements without Meters')

Analysis of wind speed in front of and behind the rotor

- While engine idle
- With loaded generator

Efficiency determination of a wind power plant

Saving energy

Energy conversion and use of wind energy

- Consideration of: energy conversion; kinetic energy; rotational energy; electrical energy; radiation energy by the LED
- Consideration of different energy conversions with buzzer, engine and light bulb (only with extension 'Measurements without Meters')

Analysis of different rotor types

- Comparison of 3-bladed and Savonius rotor
- Comparison of 2, 3 and 4-bladed rotors
- Phenomenological comparison using a light bulb (only with the extension 'Measurements without Meters')

Characteristic of the wind generator

Dependence of the wind generator on wind direction

- While engine idle (measurement of voltage)
- Loaded
- Phenomenological using a light bulb (only with the extension 'Measurements without Meters')

Other applications:

Related topics which are incidental to wind energy but are included in other areas of the curriculum

- Air resistance of different objects
- RPM measurement of the wind generator

Code: 502-032

£595.00

B lexsolar Wind Ready-to-go

The **Wind Ready-to-go** system is geared for maximum portability and utility, with the extension sets Measurements without Meters and Digital Anemometer included, allowing for a broader range of experimental possibilities. The set comes in a handy, sturdy aluminium carry case for portability, with excellent accompanying teaching resources. The kit is equally suited for secondary school students or vocational education.

Experiments:

Dependence of the power plant on wind speed

- Phenomenological with light bulb
- Through measuring the voltage at the generator
- Through determining the power output of the generator using a constant resistance

Variation of the generated voltage while connected to a power consumer

- With resistance
- With the power consumers: buzzer; engine; and light bulb.

Analysis of wind speed in front of and behind the rotor

- While engine idle
- With loaded generator

Efficiency determination of a wind power plant

Saving energy

Energy conversion and use of wind energy

- Consideration of: energy conversion; kinetic energy; rotational energy; electrical energy; radiation energy by the LED
- Consideration of different energy conversions with buzzer, engine and light bulb

Analysis of different rotor types

- Comparison of 3-bladed and Savonius rotors
- Comparison of 2-, 3-, and 4-bladed rotors
- Phenomenological comparison using a light

Characteristics of the wind generator

Dependence of the wind generator on wind direction

- While engine idle (measurement of voltage)
- While engine loaded
- Phenomenological using a light bulb

Components:

1 x Aluminum box with hard-wearing foam insert	
1 x Wind machine module	1 x Resistance module
1 x Profile rail with moveable tab for the wind machine	
1 x lexsolar base unit	1 x Potentiometer module
1 x LED module	1 x Capacitor module (0.1F)
1 x Wind turbine with adjustable blades	
1 x Wind turbine, 4-bladed	1 x Wind turbine, 3-bladed
1 x Wind turbine, 2-bladed	1 x Savonius rotor
1 x Digital anemometer	1 x Lamp module
1 x Buzzer module	2 x Digital multimeter
1 x Power supply (4 -12V DC)	2 x Test leads, black, 25cm
2 x Test leads, red, 25cm	1 x Test lead, black, 50cm
1 x Test lead, red, 50cm	

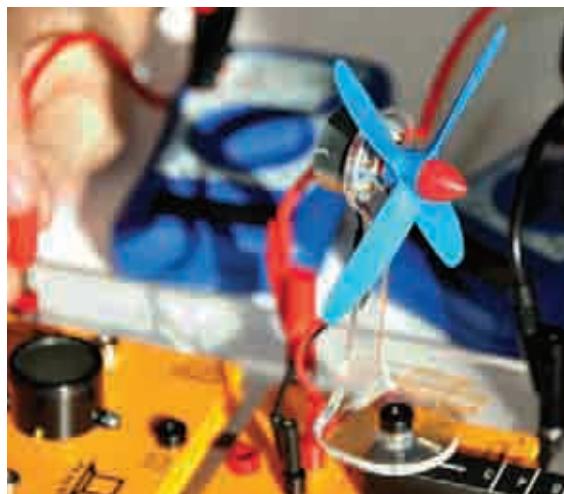
Other applications:

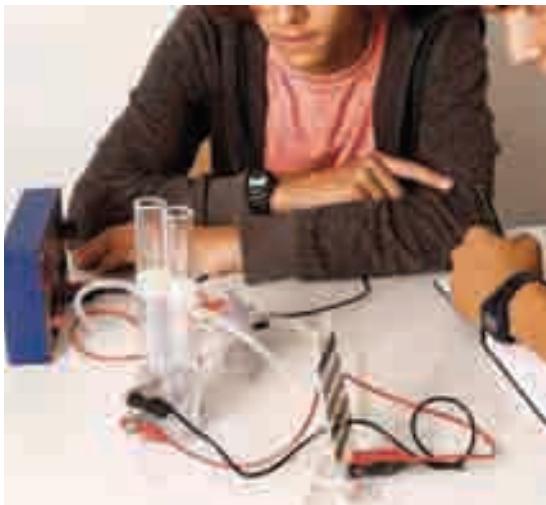
Related topics which are incidental to wind energy but are included in other areas of the curriculum

- Air resistance of different objects
- RPM measurement of the wind generator

Code: 502-033

£995.00





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A lexsolar H₂ Basic

Fuel cell technology is one of the keys to solving the problem of storing renewable energies. Fuel cells are able to transform stored energy in the form of Hydrogen (H₂) back into electrical energy.

Apart from the relevance to green energies, the **lexsolar-H₂** kits also involve basic and applied experiments in the subjects of chemistry and physics, so have cross-curricular relevance.

Targetted at pupils aged from 6-12 years, the **H₂ Basic** uses qualitative measurements to teach fundamental principles of fuel cells without complex measurements or calculations. A hand generator is included to negate the need for an external power source, and the kit covers topics such as:

What is a fuel cell and what does it do? What is an electrolyser and how can water be split with such a device? What can be powered with a fuel cell?

Experiments:

- From muscular strength to electric energy
- What is an electrolyser?
- How water can be split
- What is a fuel cell?
- Powering the motor with a fuel cell
- Powering the buzzer with a fuel cell

Components:

- 1 x Reversible fuel cell, small (including electrolyser)
- 1 x Gas storage module (storage for Hydrogen and Oxygen)
- 1 x Base unit, small
- 1 x Buzzer module
- 1 x Motor module (without gear)
- 1 x Set colour discs & mount
- 1 x Hand cranked generator
- 1 x Test lead, black
- 1 x Test lead, red
- 1 x Plastic tray including inserts, 75mm deep
- 1 x Lid for tray
- 1 x lexsolar-CD including complete students' manuals

Code: 502-037

£225.00

B lexsolar H₂ Intermediate

For students aged 10-18 years, the **H₂ Intermediate** takes a more advanced look at hydrogen fuel cell technology, involving a wide range of experiments. Included is a reversible fuel cell, combining an electrolyser and PEM fuel cell in one neat, robust unit. The electrical load modules (motor and LED) allow for practical and qualitative trials, complemented by high quality teaching resources and lesson plans. Additional equipment (e.g. multimeters or test leads) is required for some studies.

Experiments:

- Functional principles of a fuel cell
- Functional principles of an electrolyser
- How water is split into Oxygen and Hydrogen
- Powering the motor with a fuel cell
- Powering the LED with a fuel cell
- IV characteristics of the electrolyser
- IV characteristics of the fuel cell
- Faraday and energy efficiency of a fuel cell
- Solar hydrogen circuits

Components:

- 1 x Reversible fuel cell (including electrolyser)
- 1 x Gas storage module (storage for Hydrogen and Oxygen)
- 1 x Base unit, small
- 1 x Solar panel, 2.5V, 420mA
- 1 x Motor module (without gear)
- 1 x Set colour discs & mount
- 1 x LED module
- 1 x Potentiometer module 1.1kOhm
- 1 x Plastic tray including inserts, 75mm deep
- 1 x Lid for tray
- 1 x lexsolar-CD including complete students' manuals

Optional extra components to broaden experimental range:

- 2 x Digital multimeter (614-014)
- 2 x Test lead, black, 50cm (17-0385)
- 2 x Test lead, red, 50cm (17-03850)

Code: 502-038

£275.00





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A lexsolar H₂ Advanced

The **H₂ Advanced** is the most versatile kit in the **H₂** range, covering a broad range of topics including PEM reversible fuel cells, electrolysis and (with an additional module) methanol fuel cells. A measuring box, complete with internal load producer, enables clear, practical experiments to be conducted simply and easily by students.

Together with the included accessories, such as cables and high-quality learning materials, this kit aids students to understand not just the workings of fuel cell technology, but also the many practical applications.

Experiments:

- Functional principles of a fuel cell
- Functional principles of an electrolyser
- How water is split into Oxygen and Hydrogen
- IV characteristics of the electrolyser
- IV characteristics of the fuel cell
- Faraday and energy efficiency of the fuel cell
- Solar hydrogen circuits

Components:

- 1 x PEM fuel cell
- 1 x Electrolyser with storage
- 1 x Solar panel
- 1 x Test box for loads
- 1 x Stop watch
- 1 x Cable, hose, hose clip
- 1 x Plastic tray including inserts, 75mm deep
- 1 x lexsolar-CD including students' and teachers' manuals

Extra components required:

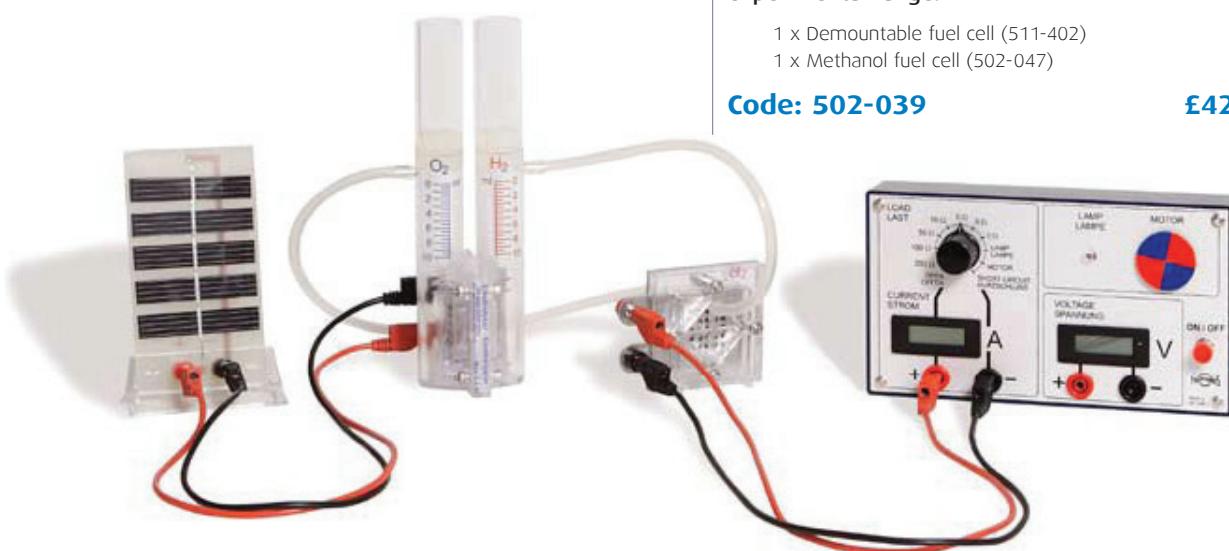
- 1 x Lamp (502-044) - but most ordinary halogen desk lamps should suffice.

Optional extra components to broaden experimental range:

- 1 x Demountable fuel cell (511-402)
- 1 x Methanol fuel cell (502-047)

Code: 502-039

£425.00



B lexsolar H₂ Global

With **lexsolar-H₂ Global**, a broad variety of experiments dealing with fuel cell technology can be conducted. The kit is equipped with a reversible fuel cell combining electrolyser mode and PEM fuel cell mode in one handy and robust unit.

All accessories needed for the experiments, like cables or multimeters, are included in the kit. Therefore, it allows an easy and fast setup in the classroom. With the electrical load modules (motor and LED), demonstrative and practical trials are also possible. High-quality teaching materials are included to guide the students through the learning experience.

Experiments:

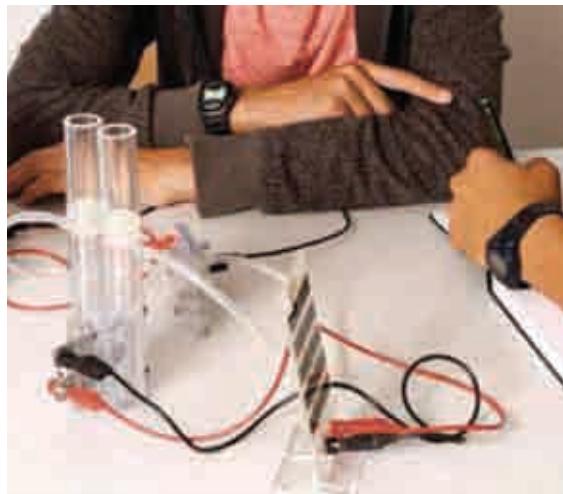
- Basic principles of a fuel cell
- Basic principles of an electrolyser
- How water is split into Oxygen and Hydrogen
- Powering the motor with the fuel cell
- Powering the LED with the fuel cell
- IV characteristics of the electrolyser
- IV characteristics of the fuel cell
- Faraday and energy efficiency of the fuel cell
- Solar hydrogen circuit

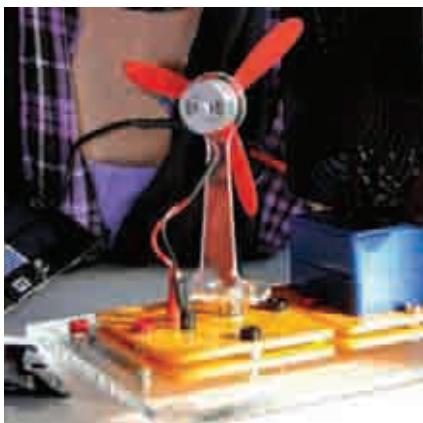
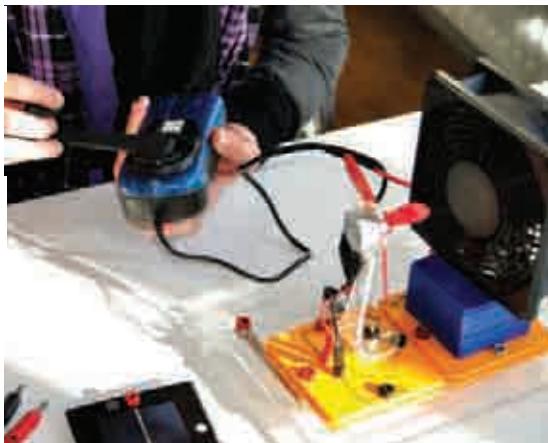
Components:

- 1 x Reversible fuel cell (including electrolyser)
- 1 x Gas storage module (storage for Hydrogen and Oxygen)
- 1 x Base unit, small
- 1 x Solar panel, 2.5V, 420 mA
- 1 x Motor module (without gear)
- 1 x Colour screen & mount
- 1 x LED module
- 1 x Potentiometer module 1.1kOhm
- 2 x Digital multimeter
- 2 x Test leads, black
- 2 x Test leads, red
- 1 x plastic tray including inserts, 75mm deep
- 1 x Lid for tray
- 1 x lexsolar-CD including complete student's manuals

Code: 502-040

£395.00





A lexsolar-SmartGrid Basic

SmartGrid is the efficient steering and networking of energy sources, storage and consumers within an intelligently planned grid. 100% usage of renewable energies is only attainable with such a system, and the **lexsolar-SmartGrid** teaches a holistic understanding of the way this can be achieved using the various technologies available.

SmartGrid Basic combines solar and wind energy with storage methods, all in one kit, and focuses on electrical energy in order to also cover curriculum areas concerning electricity in general, energy and energy conversion. This makes it a powerful teaching tool, suited to children aged from 6-13 years, covering a wide range of topics while imparting an all-round understanding of renewable energies and their applications. The kit requires no external power source, as energy is provided by use of a hand-cranked generator operated by the student.

Experiments:

Topic I: Energy forms and energy conversion

- Electrical energy and electrical circuits
- The solar cell as an energy source
- The orientation of the solar cell to the light
- The difference between solar cells and solar panels
- Partial shading of solar panels
- Wind energy conversion
- The influence of wind direction

Topic II: Energy storage

- Storage of solar energy
- Storage of wind energy
- Generation of hydrogen (only with the additional fuel cell extension, 511-402)

Topic III: Saving energy

- Comparison of energy consumption by incandescent light sources and LED's

Components:

- 1 x Plastic box with hard-wearing foam insert
- 1 x Base unit
- 1 x Hand-cranked generator
- 1 x Wind machine (fan)
- 1 x Solar panel, 1.5V, 200mA
- 1 x Solar panel, 0.5V, 840mA
- 1 x Lighting module
- 1 x Wind generator (also useable as engine)
- 1 x Buzzer module
- 1 x LED module
- 1 x Lamp module
- 1 x Capacitor module
- 2 x Test leads
- 1 x Set colour screens with mount

Code: 502-043

£595.00


B

B lexsolar-Esave Ready-to-go

With the growing global demand for energy, fuelled by increasing population and industrialization worldwide, greener energy alone will never meet the energy demands of our planet in the future; the problem needs to be tackled at both ends, by increasing efficiency and reducing wastage on personal and global levels, therefore keeping energy demands as low as reasonably possible. The aim of the **lexsolar-Esave** kits is to increase an understanding of the various ways we use and waste energy - and how energy wastage can be reduced without drastic reductions in quality of life.

The **ESave Ready-to-go** brings the topic of energy to life, focusing on real-world applications and issues. Students are encouraged to take a holistic approach, starting from topics such as worldwide or household energy consumption and climate change, then conducting experiments to measure relevant variables like room temperature, water or energy consumption. Students gain an understanding and mindfulness of various ways to decrease ecological impact, through potential energy efficiencies and savings.

Experiments:

Understanding energies

- Primary and secondary energy, resources and reserves
- Units and conversions, important sizes
- Production of electricity, comparison of power plants
- Worldwide energy consumption
- Climate change and CO₂
- Why save energy?
- Where do we need energy?

Heating

- Learn more about your school (energy source, location, costs)
- Classroom temperature
- Heat loss of buildings
- Air quality
- Heating and ventilating: correct behavior
- Humidity

Water

- Learn more about your school (where does drinking water come from, where does the used water go, annual consumption, costs)
- Hot water preparation
- Where and how water is consumed: correct behaviour

Electrical consumption

- Learn more about your school (energy supplier, annual consumption, costs)
- Electrical energy in everyday life
- Electrical energy in the kitchen
- Energy guzzlers
- Hidden loss: standby-mode versus switched-off

Light

- Light in the classroom
- Comparison of different light sources
- Researching differences in brightness

Code: 502-041

£995.00



Components:

- 1 x Data Logging USB base station with power supply
- 3 x Temperature sensors for indoor use (temperature range: -30°C - 80°C/-22°F - 176°F, measuring accuracy: ±0.5°C/0.5°F)
- 1 x combined humidity-temperature-sensor (0-100 % relative humidity, accuracy: ±4.5%, temperature range: -40°C - 120°C / -40°F - 248°F, ±0.5°C / 0.5°F)
- 1 x Temperature sensor for outdoor use (temperature range: -30°C - 80°C/-22°F - 176°F, measuring accuracy: ±0.5°C/0.5°F)
- 1 x Digital Lux meter (0.01 - 50,000 Lux)
- 1 x Infrared thermometer
- 2 x Electricity meter
- 1 x Flow meter
- 1 x Set detailed worksheets
- 1 x Robust aluminum case with foam inserts

Optional extra components to broaden experimental range:

- 1 x CO₂ / Temperature measurement tool (776-036)



lexsolar Extension Sets



A



B



A 'Muscle Powered Sun'

The 'Muscle powered sun' extension for **leXsolar-Photovoltaic Basic** enables various leXsolar items to be used without the need for extension cables, a power supply, or even sunlight - anywhere and anytime. When operated by students, the durable hand crank provides the necessary power to drive the lighting module, or 'Sun'. It fits neatly into a ready-made niche in the **PV Basic** insert, making it a perfect complement to the kit.

Components:

- 1 x Lighting module
- 1 x Hand-cranked generator
- 1 x Set colour screens with mount

Code: 502-034

£99.00

B 'Measurements without Meters'

This expansion increases the functionality of the **leXsolar-Photovoltaic Advanced** and **leXsolar-Wind Advanced** for students between the ages of 11-15 years. Three energy-consuming modules (motor, buzzer and lamp) allow additional qualitative and demonstrative experiments.

Components:

- 1 x Buzzer module
- 1 x Lamp module
- 1 x Motor module (without gear)
- 1 x Set colour discs & mount

Code: 502-017

£59.00

MEASUREMENT

C Measurement in the Laboratory

Study key measuring methods & techniques. Expand the foundational science skills of your class, making them familiar with the basic units of measurement. Your students will master the common measurement skills used in the introductory science laboratory through skill-oriented explorations. Using comprehensive, curriculum-based investigations, they learn about the metric system, mass, volume, density, gravity, temperature and pH. Through these activities, the class gains a thorough understanding of how to gather information, graph and analyze data, and interpret scientific diagrams. Class size - 40 students. Suitable for KS3.

Code: 20-1053 - Lab Investigation £86.00



D Fleming Apparatus

Fleming's apparatus for supplies up to 6V 3A D.C.

Code: FLM £30.00

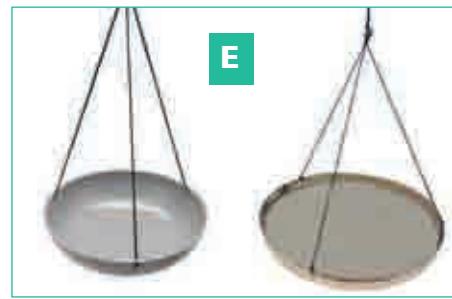


E Scale Pans

75mm diameter with suspension cords and hook.

Code: PH0303A - Brass £8.00

Code: PH0303B - Bakelite £3.15



F Forcemeeters

High quality tubular spring balances which are colour coded and scaled in both newtons and grams. The stainless steel spring mechanism is clearly visible and zero adjustment is incorporated.

Code: ATSP0250 - 250g/2.5N, Blue £2.95

Code: ATSP0500 - 500g/5N, Green £2.95

Code: ATSP1000 - 1kg/10N, Beige £2.95

Code: ATSP2000 - 2kg/20N, Red £2.95

Code: ATSP3000 - 3kg/30N, White £2.95

Code: ATSP5000 - 5kg/50N, Yellow £2.95

Code: EDU100 - Boxed Set of 6 £17.00




A

Two Way Forceometers

A series of tubular meters used to investigate measurement of force involving either a push or a pull action. Calibrated in grams and newtons. The extended rod has a clear flat surface to mark own scales of measurement using a dry wipe marker. The range of six balances is colour coded for easy reference.

Code: SBPP25 - 250g/2.5N, Blue	£3.95
Code: SBPP5 - 500g/5N, Green	£3.95
Code: SBPP10 - 1kg/10N, Beige	£3.95
Code: SBPP20 - 2kg/20N, Red	£3.95
Code: SBPP30 - 3kg/30N, White	£3.95
Code: SBPP50 - 5kg/50N, Yellow	£3.95
Code: SBPP100 - Set of 6	£22.00


B
B

Dual Scale Spring Balances

Metal cased, flat form, dual scale spring balance.

Code: PH0026A - 100g/1N	£7.50
Code: PH0026B - 250g/2.5N	£7.50
Code: PH0026C - 500g/5N	£7.50
Code: PH0026D - 1,000g/10N	£7.50
Code: PH0026E - 2,000g/20N	£7.50
Code: PH0026F - 5,000g/50N	£7.50
Code: PH0026G - 10,000g/100N	£7.50


C
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Brass Masses

Small form slotted masses and hangers.

Code: MB001 - 1g	£0.70
Code: MB002 - 2g	£0.70
Code: MB005 - 5g	£0.75
Code: MB010 - 10g	£0.75
Code: MB020 - 20g	£1.00
Code: MB050 - 50g	£1.75
Code: MB100 - 100g	£2.75
Code: MHB010G - 10g Hanger only	£1.55
Code: MHB020G - 20g Hanger only	£1.90
Code: MHB050G - 50g Hanger only	£2.35
Code: MHB100G - 100g Hanger only	£3.30

D Slotted Brass Mass Sets

Small form slotted mass & hanger set.

Code: EDU087	£7.25
- 100g (10g Hanger, 9x10g Masses)	
Code: P260	£6.50
- 100g (20g Hanger, 4x20g Masses)	
Code: P262	£13.00
- 250g (50g Hanger, 9x20g, 1x10g, 2x5g Masses)	
Code: EDU088	£19.50
- 500g (50g Hanger, 9x50g Masses)	
Code: EDU089	£35.50
- 1000g (100g Hanger, 9x100g Masses)	
Code: EDU1025	£22.00
- 438g (50g Hanger, 1 each : 200g, 100g, 50g, 20g, 10g, 5g, 2g & 1g)	



D

E Cast Alloy Masses

Flat masses, with large central hole and small slot to prevent masses sliding off hanger. Manufactured from cast alloy, accuracy 1%.

Code: EDU877 - 10g, Pack of 3	£2.25
Code: EDU878 - 20g, Pack of 3	£3.50
Code: EDU879 - 50g, Pack of 3	£5.95
Code: EDU903 - 100g, Pack of 5	£12.00
Code: EDU880 - 50g Hangers, Pack of 3	£7.95
Code: EDU902A - 100g Hangers, Pack of 3	£18.00

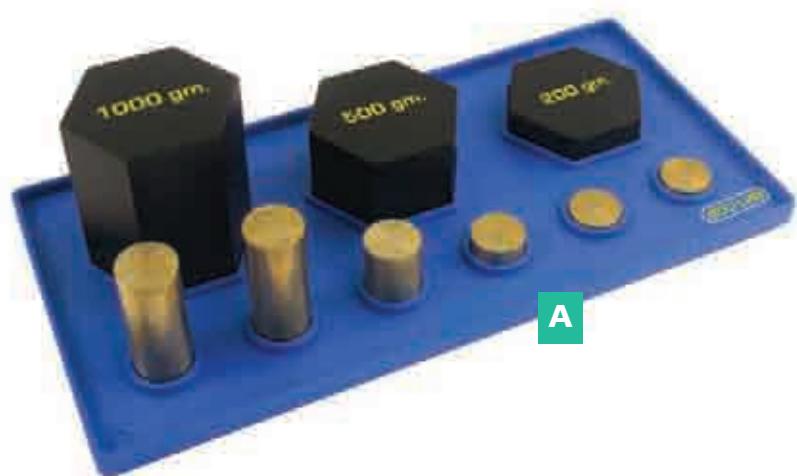


E F

F Cast Alloy Mass Sets

Small format cast alloy mass & hanger set.

Code: EDU904	£9.00
- 100g (9x10g Mass, 1x10g Hanger)	
Code: EDU904A	£30.00
- 100g (9x10g Mass, 1x10g Hanger), Pack of 4	
Code: EDU905	£14.50
- 1000g (9x100g Mass, 1x100g Hanger)	
Code: EDU905A	£50.00
- 1000g (9x100g Mass, 1x100g Hanger), Pack of 4	



A

Weighing Set on Tray

A combined set of accurate steel and brass weights that are housed in a sturdy blue moulded tray. Provides for weighing objects from 10g to 1990g in 10g increments. 3 steel weights and 6 brass weights.

Contents:

1 each of - 1kg, 500g, 200g, 50g, 20g;
2 each of - 100g & 10g; 1 Moulded Tray.

Code: EDU769

£27.00



B

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Cast Masses

Large format slotted mass.

Code: EDU771 - 100g	£3.00
Code: EDU772 - 200g	£4.25
Code: EDU773 - 500g	£6.25
Code: EDU774 - 1kg	£8.95
Code: EDU775 - 2kg	£17.00
Code: EDU776 - 5kg	£29.00
Code: EDU777 - 10kg	£58.00
Code: EDU778 - 500g Hanger only	£7.00
Code: EDU779 - 1kg Hanger only	£14.75



C



C

Hexagonal Masses with Rings

Hexagonal iron mass with lifting ring.

Code: HEX50 - 50g	£3.25
Code: HEX100 - 100g	£3.50
Code: HEX200 - 200g	£3.75
Code: HEX500 - 500g	£5.95
Code: HEX1000 - 1kg	£7.50
Code: HEX2000 - 2kg	£17.50
Code: HEX5000 - 5kg	£37.50

D Newton Masses

9 slotted brass masses with hanger.

Code: PH0258A-NTN £11.00

- 1N: 9 x 0.1N masses, 1 x 0.1N hanger

Code: PH0258B-NTN £34.00

- 10N: 9 x 1N masses, 1 x 1N hanger

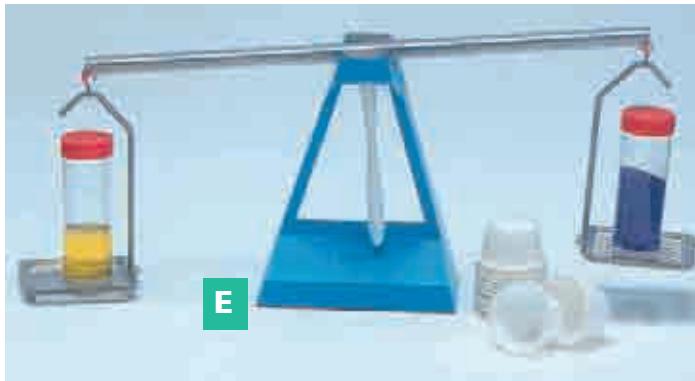


D

E Equal Arm Beam Balance Kit

An educational standard, this balance features a durable one-piece base, moulded of high impact styrene with three-point suspension for self-levelling. The beam is aluminium for lightweight sensitivity and pivots from self-aligning genuine agate bearings. Two sliding weights provide for fine adjustment. With a load of 50 grams per pan, the balance has an ultimate sensitivity of 10mg.

Code: 3802 £40.00



E

F Vernier Calliper Gauges, 0-12cm

Plated steel, Columbus type callipers enabling the user to read either inside, outside or depth measurements. With dual scale, 0-12.5cm x 0.1mm. Imperial scale graduated to 5 x 1/128". Provided with thumb wheel for easy motion of jaws.

Code: P78 £15.00



F

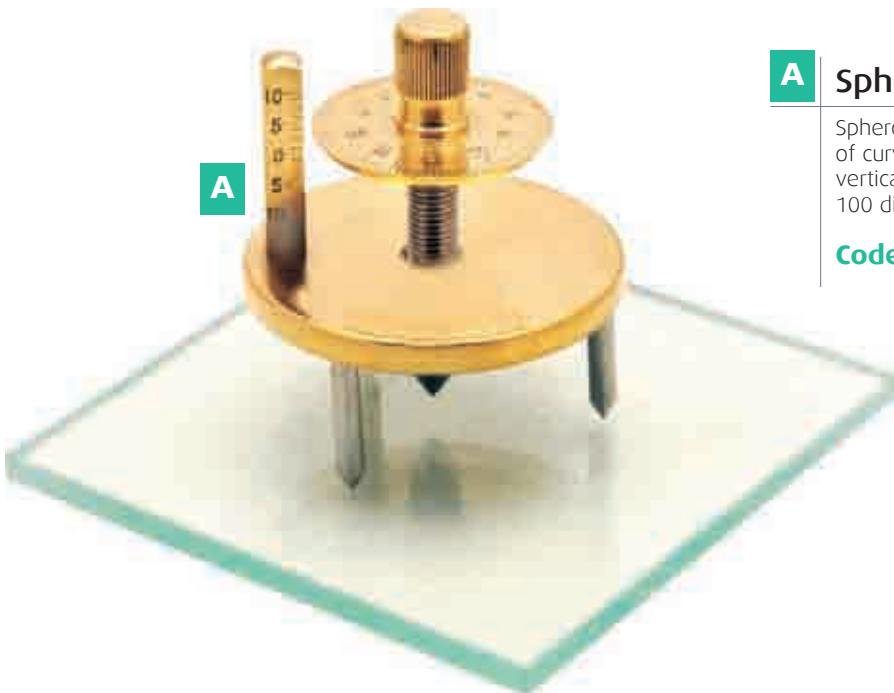
G Vernier Calliper Gauges, 0-15cm

IME type, improved design, plated steel with dual scale, 0-15cm x 0.1mm and 6 x 1/128". Provided with thumb movement for easy motion of jaws. Supplied in plastic case.

Code: P80 £19.00



G



A Spherometer

Spherometer for the accurate measurement of the radius of curvature of spherical lenses. Made of brass with a vertical scale of 10-0-10mm and a micrometer scale with 100 divisions.

Code: PH0092

£9.50



B Opisometer

For measuring the length of curved lines. Consists of a knurled wheel which runs on a transversely mounted threaded spindle.

Code: PH0094

£4.50



C In-Out Calipers

Steel calipers for external and internal measurement.

Code: PH0082

£2.15



D Micrometer Screw Gauge

Made of nickel-plated brass with ratchet top. Accurately machined stainless steel rod with range 0-25 x 0.01mm. Lock type. For outside measurements up to 25mm. Supplied in plastic case. Precision: 1/100mm.

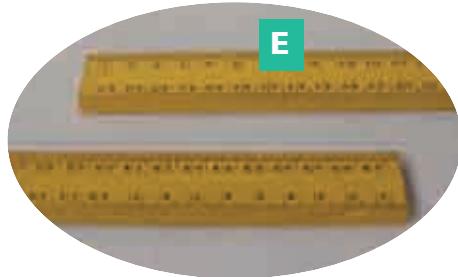
Code: P86

£15.00

E Rules

Well finished hardwood ruler graduated on both edges in centimetres and millimetres. One edge labelled left to right, the other edge in reverse.

Code: RU08 - 0.5metre	£1.75
Code: RU06 - 1metre	£2.50
Code: RU06/10 - 1metre, Pack of 10	£19.50



F Inclined Plane with Angle Measure

A board with a well-finished metal base 450 x 150mm hinged at one end supporting a scaled, plane board. The planed section can be inclined and fixed at any angle from 0 to 45° to the horizontal. The end of the inclined board features an adjustable pulley wheel from which masses can be suspended. Supplied without weights.

Code: PH0334	£49.00
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G Inclined Plane with Friction Board

For investigating sliding friction. Consisting of a plane board hinged at the base at one end, with a pulley for the force cord at the other end. The inclination of the plane is variable and is locked into position by means of a screw clamp with pointer. Clear increments reflect the selected angle on the attached angle measuring plate. Complete with scale pan and two slides and a 75 x 25mm metal roller. Board dimensions 600 x 75mm.

Code: PH0337	£55.00
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H Stop Clock

A general purpose stop clock with large start and reset triggers for operation. Housed in a black powder-coated metal case with 100mm dial. Packed in sturdy case with protective foam insert.

Code: STPCLK	£16.95
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A

A

Laboratory Timer

This is a precision digital timer used to measure the time interval between any two events with high accuracy. The timer standard accuracy has been achieved using the 10MHz Quartz Crystal Oscillator. The timer has four operating modes: Manual, Freefall mode, Timing Gates mode and any other triggering start and stop. The timer has a built-in power source for the Edu-Lab Timing Gates (code: EDU096A) and the G by Freefall Apparatus (code: GFF). Display: 14mm LED.

The pair of timing gates is housed in tough moulded cases giving excellent durability. The lamps operate on 6 volts. A special built-in circuit prevents lamps from damage in case higher voltage is accidentally applied. The timing gates can be connected by 4mm sockets to a timer and power supply.

Code: EDU096 - Timer £178.00

Code: EDU097 - Timer + Timing Gates £199.00



B

B

Digital Electronic Countdown Timer

Large digital countdown timer with range up to 99 minutes and 59 seconds, with resolution of 1 second. Countdown only. Comes with stand, clip and magnetic fixing. Size: 80 x 70 x 20mm. LCD size: 64 x 38mm.

Code: EDU1022 £9.00



C

C

Ticker Tape Holder

A specially designed stand to hold our ticker tape rolls, makes an excellent accessory

Code: PH0353D £42.00

Ticker Tape Timers

These devices use an electromagnet which activates a striker, producing dots via a carbon disk on the ticker tape. The dots are produced at a rate of 50 - 60Hz depending on the mains frequency. With 4mm terminal sockets. The Ticker Tape Timers are used in the measurement of velocity, acceleration and general timing. There are 6V & 12v units available - please check your unit rating before connecting the unit to a PSU.

D 12V Model without Accessories

12V AC, 50Hz: 50Vib/Sec, 60Hz: 60Vib/Sec. With 4mm terminal sockets.

Code: EDU1089 £47.00
Code: 281-003 - Spare Roll £4.50



E 12v Model without Accessories

The Edu-Lab Ticker Tape Timer has a frequency of 50 to 60Hz, equivalent to that of the mains power supply. It will give good results if operated from a 12V AC power supply unit. Higher voltage causes the tape to be subject to a greater drag.

Code: EDU035 £39.00



F 6v Model with Accessories

The Edu-Lab Ticker Tape Timer has a frequency of 50 to 60Hz, equivalent to that of the mains power supply, and is supplied with one roll of ticker tape and a pack of 100 Carbon Discs (code: EDU037). It will give good results if operated from a 6V AC power supply unit. Higher voltage causes the tape to be subject to a greater drag.

Code: EDU042 £35.00



G Ticker Tape Rolls

Ticker Tape Rolls for Ticker Tape Timers (codes: EDU035, EDU042). 30m x 15mm.

Code: EDU036 - Pack of 5 rolls £8.50



H Ticker Tape Carbon Discs

Ticker Tape Carbon Discs, 50mm dia with 4mm hole, for Ticker Tape Timers (codes: EDU035, EDU042).

Code: EDU037 - Box of 100 £4.75



A



B

A

Picoammeter

The Picoammeter is designed to measure very small currents and has 10 ranges, selected by a rotary switch, from 100pA to 3 μ A. The instrument has a large moving coil meter. It can be auto-zeroed by a membrane switch. Input is by way of a UHF socket for shield leads, alternatively 4mm plugs can be plugged into the UHF socket and associated 4mm socket. Input impedance 10M Ω will not be damaged by voltages up to 5KV. Suggested uses include measurement of current for Plank's constant experiments, ionization currents, reverse current of silicon diode, resistivities of wood and paper, capacitor leakage current, etc. Comes complete with a UHF male to 4mm plug shield lead. UHF socket for shielded lead.

Specification:

Measurement: 10 ranges, from 100pA to 3 μ A

Input voltage: up to 5KV

Input impedance: 10M Ω

Input: UHF sockets, complemented by 4mm socket for negative input

Power: PP3 9V battery

Dimensions: 208 x 155 x 115mm (W x H x D)

Height including handle is 187mm.

Code: 614-008

£155.00

B

Microvoltmeter

The Microvoltmeter is an effective and robust replacement for a spot galvanometer with nine ranges from 100 μ V to 3 μ V. The input resistance is 10M Ω /V and is 1K on the 100V range which is considerably better than a spot galvanometer. The instrument has a large moving coil meter which can be auto-zeroed by a membrane button switch. Input is by way of 4mm sockets or, for very low voltages where a shielded lead is preferred, UHF socket. Suggested uses include measurement of e.m.f.'s from thermocouples, strain gauges and hall effect devices, electromagnetic induction measurements, etc.

Specification:

Measurement: 9 ranges, from 100 μ V to 3 μ V

Input impedance: 10M Ω per volt, maximum 30M Ω

Input: 4mm socket or UHF socket, complemented by a 4mm socket for negative input

Power: PP3 9V battery

Dimensions: 208 x 155 x 115mm (W x H x D)

Height including handle is 187mm.

Code: 614-009

£155.00

C Centre Zero Universal Meter Galvanometer

50uA-0-50uA. 1000 ohm movement, moving coil, diode protection against overload up to 12V d.c. The centre zero universal meter (universal galvanometer) is electrically identical to the universal meter. The unit is ideal for use as an indicator in slow a.c.

Code: 281-024

£45.00



D Basic Universal Meter

1000 ohm movement, moving coil, scale length 100 mm, accuracy +/-2% (class 2.0) of f.s.d. Very large range of multiplier and shunt available. Diode protection.

Code: 281-023

£45.00



E DC Shunts & Multipliers for Universal Meters

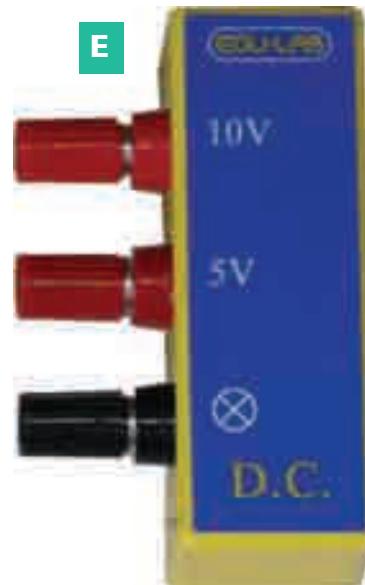
The Edulab shunts and multipliers are designed to provide protection due to overloads that commonly occur in practical experiments. The units are robust and are designed for reliability. 4mm sockets are used. The ranges of current and voltage are common to most practical work.

Multipliers:

Code: 281-025	0-1V-5V-10V-50V	£19.00
Code: 281-019	0-1V-5V	£15.00
Code: 281-027	0-5V-10V	£15.00
Code: 281-026	0-10V-50V	£15.00
Code: 281-022	0-5V-10V	£17.00
Code: 281-015	0-10V-20V	£17.00
Code: 281-020	0-20V-50V	£17.00

Shunts :

Code: 281-028 - Shunt, +/-3.5mA	£15.00
Code: 281-021	£15.00
- DC Shunt, Dual Range 0-50-100mA	
Code: 281-016	£17.00
- DC Shunt, Triple Range 0-1-10-100mA	
Code: 281-014	£34.00
- AC Shunt, Triple Range 0-10mA-50mA-100mA	
Code: 281-017	£34.00
- AC Shunt, Triple Range 0-1-5-10A	




A

Ammeters

Moving coil, DC only, with 4mm socket terminals.

Size: 125 x 80 x 80mm. Scale length: 60mm.

Other measurement ranges available - please enquire for further details

Code: AMTER1A - 0-1A, Single Range £6.50

Code: AMTER2A - 0-2A, Single Range £6.50

Code: AMTER5A - 0-5A, Single Range £6.50

Code: PH1074B - 0-1/0-5A, Dual Range £15.75


B

Digital Multimeter

Specification:

Display: 1999 counts, digits are 15mm high

DC voltage: 200m/2/20/200V \pm 0.5%, 600V \pm 0.8%

AC voltage: 200/600V \pm 1.2%

DC current: 2m/20mA \pm 1.0%, 200mA \pm 1.5%, 10A \pm 3.0%

Resistance: 200/2k/20k/200k/2M Ω \pm 1.0%

Code: EDU199 £11.00


C

Digital Coulomb Meter

The display shows the number of Coulombs deposited into the instrument, either by current through a resistance or from a capacitor, or from a source of static electricity. Displays up to 199 nC, accuracy \pm 10nC.

Code: 231-037 £62.00

D Voltmeters

Moving Coil, DC only with 4mm socket terminals.
Single and Dual range models available.
Size: 125 x 80 x 80mm. Scale length: 60mm.

Code: PH1080A - 0-1v, Single	£6.50
Code: PH1080AA - 0-1.5v, Single	£6.50
Code: PH1080AB - 0-3v, Single	£6.50
Code: PH1080AC - 0-5v, Single	£6.50
Code: PH1080AC6 - 0-6v, Single	£6.50
Code: PH1080AD - 0-10v, Single	£6.50
Code: PH1080AE - 0-15v, Single	£6.50
Code: PH1080AF - 0-30v, Single	£6.50
Code: PH1080AG - 0-50v, Single	£6.50
Code: PH1080B - 0-1V/5V, Dual	£13.00
Code: PH1080BA - 0-5V/10V, Dual	£13.00
Code: PH1080BB - 0-5V/15V, Dual	£13.00

D



E Galvanometers

High quality moving coil meters. Colour coded with 4mm socket terminals for ease of connection.

Code: PH1084A - 1-0-1mA	£19.00
Code: PH1084B - 35-0-35mA	£19.00
Code: PH1084C - 3.5-0-3.5mA	£19.00
Code: PH1084D - 30-0-30, 200µA	£19.00
Code: PH1084 - 50-0-50mA, DC only	£19.00

E



F Ohmmeter

Designed for measuring resistance in electric circuits.
Housed in unbreakable case with clear front cover.
Series, 0-100Ω.

Code: PH1106B	£37.00
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F





A



B

A

Interscale Demonstration Meter

Housed in an ABS plastic case 300 x 150 x 300mm with glass front and rear. Moving coil type with accuracy of $\pm 2.5\%$. Basic sensitivity of meter is 5mA, 100mV f.s.d. The meter can be used to demonstrate the working principle of AC or DC ammeters or voltmeters with the interchangeable plastic scales.

Designed for use with the various interchangeable scale dials (codes: PH1118A1, etc.), depending on the range being measured.

Code: PH1116

£59.00

B

Demonstration Meter Dials

For use with PH1116 (pictured is the PH1116 housing containing one of the interchangeable dials). Each dial comprises a laminated plastic panel (315 x 115mm), with a sealed moulded box at one end which contains the shunt or voltage multiplier appropriate to the scale.

Code: PH1118A1 - 2.5-0-2.5mA, DC	£10.00
Code: PH1118A2 - 0-1V, DC	£10.00
Code: PH1118A3 - 0-10mA, AC	£10.00
Code: PH1118A4 - 0-5V, AC	£10.00
Code: PH1118A5 - 0-100mV	£10.00
Code: PH1118B1 - 10-0-10mA, DC	£10.00
Code: PH1118B2 - 0-5V, DC	£10.00
Code: PH1118B3 - 0-50mA, AC	£10.00
Code: PH1118B4 - 0-10V, AC	£10.00
Code: PH1118B5 - 0-500mV	£10.00
Code: PH1118C1 - 0-10mA, DC	£10.00
Code: PH1118C2 - 0-10V, DC	£10.00
Code: PH1118C3 - 0-100mA, AC	£10.00
Code: PH1118C4 - 0-15V, AC	£10.00
Code: PH1118D1 - 0-50mA, DC	£10.00
Code: PH1118D2 - 0-15V, DC	£10.00
Code: PH1118D3 - 0-500mA, AC	£10.00
Code: PH1118D4 - 0-50V, AC	£10.00
Code: PH1118E1 - 0-100mA, DC	£10.00
Code: PH1118E2 - 0-300V, DC	£10.00
Code: PH1118E3 - 0-1A, AC	£10.00
Code: PH1118E4 - 0-300V, AC	£10.00
Code: PH1118F1 - 0-500mA, DC	£10.00
Code: PH1118F2 - 5-0-5V, DC	£10.00
Code: PH1118F3 - 0-5A, AC	£10.00
Code: PH1118G1 - 0-1A, DC	£10.00
Code: PH1118G2 - 10-0-10V, DC	£10.00
Code: PH1118H - 0-5A, DC	£10.00
Code: PH1118I - 0-10A, DC	£10.00

C Joule Meter - Mounted on Stand

A domestic electricity meter adapted to operate on single phase 50Hz, 12V AC up to a maximum current of 8.33A RMS. The meter is mounted on a robust bench stand with 4mm input and output socket terminals. The aluminium disc rotates once for every 100 joules. Larger readings are indicated by three digits calibrated at 100, 1000 and 10,000 joules per division, respectively.

Code: PH0466A

£110.00



D Joule Meter - Single Phase

A single phase energy meter mounted on a support in a transparent case to enable students to observe the movement of the meter. A bulb holder and power cord are supplied in order to observe the working of the meter when power is switched on.

Code: PH0466B

£110.00



E Digital Joulemeter/Wattmeter

The Edu-Lab Joulemeter/Wattmeter is light, compact, and designed for class demonstration or student use. The unit can measure energy taken up by a load, either by AC power or DC power, and from 1J to 999,999J or 1mj to 999,999mj and can also measure power level of 200mW to 200W. One pair of 4mm sockets is also provided to indicate the instantaneous power. Depending on mW / mj or W / J range, 1V full scale deflection represents 100mW or 100W respectively.

Specification:

Design: single chip microprocessor with dedicated precision analogue multiplier for power measurement.
 Input Voltage: 0 to 15V AC, (0 to 21V DC), absolute maximum 35V DC, 24V AC. Maximum current: 10A AC / DC.
 Input Frequency: 0 to 500Hz Maximum.
 Accuracy: 5%, typically better than 3% at full scale.
 Energy / Power Indications: 6 digits.
 Built-in timing function. Power Supply: 220V A.C. 50/60Hz.
 Dimensions: 208x155x115mm.

Code: 211-001

£235.00





A



A

Mains Joulemeter

The mains Joulemeter / Wattmeter is accurate, light and compact. It is designed for class demonstration and also for student use. The meter measures the energy or power delivered to a mains appliance. Current transformers and sampling voltage transformer isolate the unit from the mains. Determines the energy consumed by domestic appliances. Compare the efficiency of different types of lamp bulbs. Compare power consumption for lamp bulbs at different voltages (variable mains transformer unit required) Analogue outputs for datalogger or oscilloscope. Built in timing function.

Specification:

Measurement range: 200W and 2KW full-scale reading for power measurement. 0 to 999,999 J or 0 to 999,999KJ for energy measurement.

Resolution: 0.5J/ 0.5W on the 200W range and 0.005KJ/ 0.005KW on the kW range.

Maximum current: 10A. Input impedance: 1MΩ. 1V full-scale instantaneous power indication by a pair of 4mm meter output sockets.

Energy Indication by six 7-segment LEDs.

Accuracy: 3% and typically better than 1%.

Linearity: 2% and typically better than 1%.

Mains supply: 230V ±5%, 50Hz.

Internal Fuse: 315mA (L).

External fuse: 10A fast blow (in IEC socket).

Dimensions: 208 x 155 x 115mm (W x H x D).

Height including handle is 187mm.

Code: 614-007

£265.00



B

Student Digital Joulemeter

The Edu-Lab Student Joulemeter is designed specifically for student use. The unit can measure energy from 1 joule to 999,999 joules, with accuracy of 3%, but 1% accuracy is typical. Power is by means of a 9V DC mains adaptor (included). Clear operation instructions printed on underside.

Specification:

Input voltage: 0V to 15V AC, or 0V to 21V DC (maximum).

Maximum load current : 10A AC/DC.

Circuitry : Microprocessor, combined with precision voltage multiplier.

Dimensions: 90 x 90 x33mm. Display: 2 x 16 character LCD. Built-in timing function, the start button starts timer and joulemeter together and at the same time starts powering up the load. The stop button stops the timer and joulemeter, and disconnects the input power from the load.

Code: 605-014

£99.00



C Electrometer, DC Amplifier

Used for measurement of small current, small charge or time constant for RC experiments. Rotary switch of extremely high insulation resistance ($>500\text{G}\Omega$) is employed to select resistors or capacitors, to discharge the capacitor or leave them open. Typical half times for this unit, for the built in 1nF , $100\text{G}\Omega$ or 100nF , $1\text{G}\Omega$ RC pairs, are from 67 to 71 seconds against theoretical values of 69.3 seconds. Complete with a UHF male to 4mm plugs lead.

Professional electrometer IC; input leakage current for amplifier guaranteed less than 25fA . Built in moving coil meter, analogue outputs available for dataloggers or external meter. Input resistance over $1\text{T}\Omega$. Selection of 1nF 1% or 100nF 2% capacitors. Selection of $10\text{M}\Omega$ 1%, $1\text{G}\Omega$ 1% or $100\text{G}\Omega$ 1% resistors. $\times 1$ and $\times 10$ gain switch provides the decades between the built-in resistors. Charge or current tabulated on a table on front panel for easy reference, measurement range from 1pA to 100nA , 0.1nC to 100nC .

Specification:

Input: UHF socket, supplemented by a 4mm socket for negative input. Input resistors: $10\text{M}\Omega$ 1%, $1\text{G}\Omega$ 1%, $100\text{G}\Omega$ 1%.

Input impedance: Over $1\text{T}\Omega$.

Measurement ranges: 1pA to 100nA , 0.1nC to 100nC .

Power supply: 9V PP3 Battery, alkaline battery recommended.

Dimensions: $208 \times 155 \times 115\text{mm}$ (W x H x D).

Height including handle is 187mm.

Gain selection: $\times 1$ or $\times 10$ - selected by toggle switch.

1V auxiliary output is provided for data-loggers.

Code: 614-006

£235.00



D EHT Power Supply

Adjustable 5KV output, fully isolated and monitored output on a digital display. Output current is electronically limited to 2mA by 100K resistors to avoid larger transient currents. In addition to the 0-5KV outputs, there are further outputs linked by $25\text{M}\Omega$ resistors providing EHT outputs appropriate for electrostatic experiments with a short circuit current of $60\mu\text{A}$.

The switching transformer is specially wound so the output maintains a stable voltage with time. Auxiliary output is provided to drive cathode heaters etc.

An Independent earth terminal is available for earthing any of the five output sockets.

Suitable for driving Teltron tubes and electrostatic experiments. Continuously variable, 0-2.5KV or 0-5KV at a maximum current of 2mA. Two secondary outputs with $25\text{M}\Omega$ resistors (total 50M for 5KV range). Bright 12.5mm green LED display indicating EHT output. Shrouded sockets suitable for standard 4mm plugs or shrouded plugs.

Specification:

Output: 0-5KV DC, 2mA or 2.5KV DC, 2mA. Fuse: 315mA (L).

Mains supply: 230V 5%, 50Hz or 110V 5%, 50Hz.

Dimensions: $208 \times 155 \times 115\text{mm}$ (W x H x D). Height including handle is 187mm.

Secondary outputs with $25\text{M}\Omega$ safety resistors. Auxiliary output of 6.3V AC, 1A for cathode heaters, protected by resettable fuse. Independent Earth Terminal for earthing of any one of the five output sockets.

Code: 605-006 - 240V model **£315.00**

Code: 605-015 - 110V model **£315.00**





A

A

High Tension Power Supply

The Edu-Lab High Tension Power supply is designed specifically for thermionic experiments, such as the Teltron double fine beam tube. It can also be used for experiments requiring a high tension supply such as ionization current etc. It provides two independent outputs of 0-35V and 0-350V, 100mA maximum, with continuously adjustable voltages. Two auxiliary cathode heater outputs are also provided. All outputs are fully isolated from earth. Bright 12.5mm green LED display indicating HT output. Shrouded sockets suitable for standard 4mm plugs or shrouded plugs.

Specification:

Input: 220V-240V, 50/60 Hz.
 Outputs: 0-35 and 0-350V, fully regulated and maximum current is 100mA.
 Mains supply: 230V $\pm 5\%$, 50Hz. Fuse: 1A (L).
 Dimensions: 208 x 155 x 115mm (W x H x D).
 Height including handle is 187mm.
 Primary is protected by slow-blow fuse and thermal trips.
 Two auxiliary output of 6.3V a.c. 1A for cathode heaters, protected by resettable fuse. Independent Earth Terminal is provided.

Code: 605-007

£305.00

B

B

Dual $\pm 15V$ Power Supply

The Edu-Lab dual rail $\pm 15V$ power supply is a very robust power supply for use with operational amplifier circuitry. It provides ample current of 1A and is short-circuit proofed. Each unit is individually trimmed to precisely $\pm 15V$. Independent earth connection. Shrouded output sockets for standard 4mm plugs or shrouded plugs.

Specification:

Input: 230V $\pm 10\%$, 50Hz/60Hz
 Output: Dual Rail $\pm 15V$, continuously rated at maximum of 1A
 Dimensions: 208 x 155 x 115mm (W x H x D).
 Height including handle is 187mm
 Slow-blow fuse protection for primary. Thermal trip for transformer. Short-circuit proofed, regulators with thermal shut down facilities.

Code: 605-010

£135.00

C

C

Power Supply

AC/DC power supply with cooling fan and built in microprocessor overloading protection.

Specification:

Input: 230V AC, 50Hz. Output: 2-12V AC/DC in 6 steps
 Dimensions: 218 x 143 x 107mm (W x H x D)

Code: 605-001

£99.00

Code: 605-002 - Smoothed

£99.00

D Variable Power Supply, 0-25V

Popular, advanced, continuously-variable power supply unit with LED digital display. Ideal for demonstration purposes and for student use in advanced courses. It provides a fine, smooth, continuously-variable AC or DC voltage at a combined maximum current of 8.5A. The DC is smoothed by an internal 2200 μ F capacitor. AC or DC voltage reading is selected by a toggle switch and indicated on a bright green, easy-to-read 12.5mm LED display. Microprocessor tripping circuitry differentiates between a real short-circuit and a temporary current surge.

Specification:

Output Voltage continuously variable by rotary knob from 0-25V. Continuously rated combined current of 8.5A, AC or DC. Heavy-duty 40A Schottky barrier diodes employed for rectification, together with high performance toroidal transformer, reduce the weight of the power supply and power waste - thus eliminating the need for a noisy and troublesome cooling fan. Digital display for voltage for AC or DC, selected by toggle switch. Fully protected secondary by high speed, resettable microprocessor-controlled trip. Slow-blow fuse-protection for primary. Thermal fuse protection for transformer. Dimensions: 300 x 115 x 155mm (W x D x H). Weight: 5.5kg

Code: 605-013

£245.00



D

E Laboratory Bench Power Supply, 0-13V

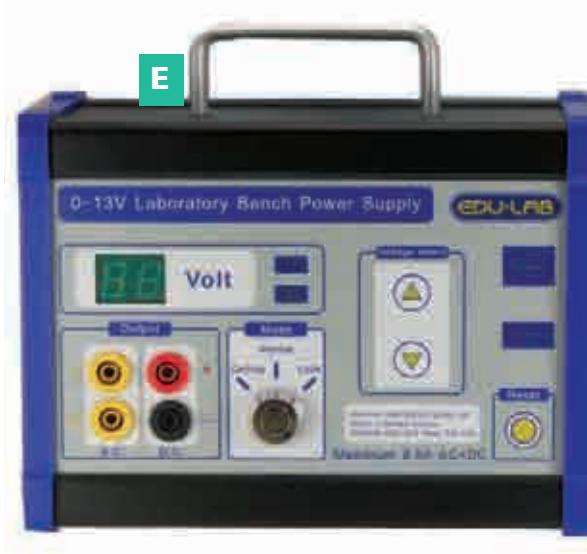
Output voltage selected by up/down push switches in 1V steps. Voltage can be switched safely at full load without serious contact wear. Output protection is handled by a 30A heavy duty relay. Fully protected secondary by high speed, micro-processor controlled and resettable electronic trip. Over current is measured and timed for cases of overload to decide tripping time, to handle initial heavy current surges. Slow-blow fuse protection for transformer primary. Shoktly barrier diodes for rectification with less voltage drop and power waste, eliminating the need for a noisy internal cooling fan.

Specification:

Size: 205 x 150 x 115mm (W x H x D). Input voltage: 240V, 50Hz. Output voltage: 0-13V a.c. at no load. Slightly smoothed d.c gives practical r.m.s values of 0-13V at no load.

Code: 605-003

£149.00



E

F Smoothing Unit

A smoothing unit for reducing ripple from non-regulated power supplies. Maintains a ripple-free output when high currents are drawn. The unit comprises a lightweight and efficient toroidal 0.1H inductor with a network of 2,200 μ F capacitors and diodes. With a supply of 12V at 3A, 1% ripple would be typical. Will work without suffering damage even at reverse polarity. Up to 8A at 35V, absolute maximum 40V d.c. (d.c. rectified from 28V a.c.). Shrouded sockets accept standard 4mm plugs and shrouded plugs.

Specification:

Input Voltage: 0 to 35V, absolute maximum 40V. Current rating: 8A maximum. Dimensions: 208 x 155 x 115mm (W x H x D). Height including handle is 187mm.

Code: 605-009

£105.00



F

PHYSICAL SCIENCE



A Middle School Physical Science Skills Game, KS3

Middle School Physical Science Skills Game - Introduction to Physical Science; Introduction to Matter; Solids, Liquids & Gases; Mixtures, Solutions & Compounds; Motion; Forces; Forces in Fluids; Work & Machines; Energy & Energy Resources; Heat & Heat Technology; Properties of Atoms; Elements & the Periodic Table; Chemical Bonding; Chemical Reactions; Acids, Bases & Salts; Organic Compounds; Electricity; Magnetism; Electromagnetism; The Energy of Waves; Sound; Light; Mirrors & Lenses; Chemistry in Our World; and Technology in Our World. The Curriculum Mastery Games are written by Teachers using research-based principles and tested in the classroom. Each Class-Pack game includes enough materials for 36 students.

Each set features:

25 Sets of 30 standards-based review cards - a total of 750 review cards. Each set is focused on a specific curriculum topic and leveled by content & readability.
 12 Double-sided, laminated game boards.
 Comprehensive Teacher Planning & Resource Guide
 Presentation CD featuring interactive review questions for use on a PC, Mac or projection unit.
 Free introductory online subscription to access interactive content, activities and assessments.

Code: 101-144

£99.00

B Physics Clever Catch®

An excellent way for students to learn basic Physics concepts. 100 questions to get them started.

Code: SR-1435

£9.50

C Physical Science Flipchart, KS 3/4)

Physical Science Flipchart - Work & Machines; Forces & Motion; Properties of Atoms; Elements & the Periodic Table; Chemical Reactions; Acids, Bases & Salts; Electricity; Magnetism; Sound & Light. 10 set series presents leveled review of Grades 1 - 8 (ages 5-14) science standards.

Each Curriculum Mastery flipchart set features:

10 Double-sided, laminated charts; Full-sized, 30 x 45cm charts; Activity Guide featuring black-line copy-masters of the charts along with review questions, vocabulary terms, suggested activities and more; Sturdy easel for years of classroom application; Activity chart featuring questions, labelling exercises, vocabulary review & more.

Code: 101-124

£30.00



C



D Physical Science Posters 890 x 584mm

Strikingly illustrated and thought-provoking laminated reference charts, featuring detailed illustrations depicting key physical science topics.

Code: 44-35-1106 - Force and Motion	£29.00
Code: 44-35-1126 - Magnetism	£29.00
Code: 44-35-1111 - Heat	£29.00
Code: 44-35-1131 - Electricity	£29.00
Code: 44-35-1121 - Light	£29.00
Code: 44-35-1116 - Sound	£29.00
Code: 44-35-1136 - Set of 6	£106.00

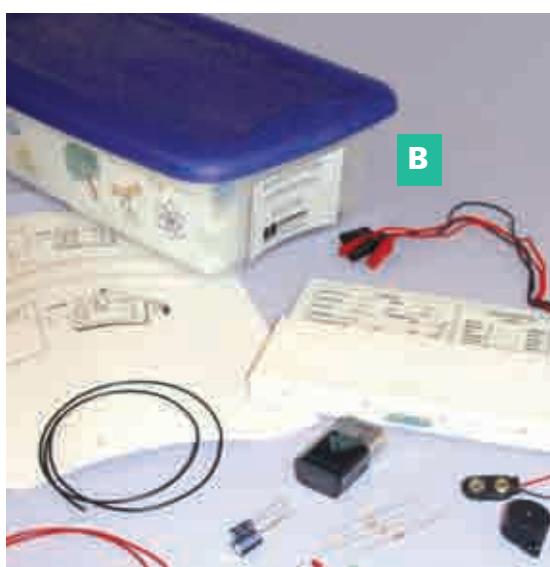


D

ELECTRICITY



A



B



C

A | Electroflash Electronics Kit

A superb resource for: investigating circuitry concepts; series and parallel bulbs; switches; resistors; incorporating meters to measure circuit values; exploring applied circuits (such as sensors, sirens, LED flashers, musical organs and more). Invaluable for prototyping circuits. Enjoy exploring electronics with this revolutionary electronics kit.

Developed by a teacher for classroom use. Attractive, easy to follow 'Learning Guide'. Challenge sheets for the more adventurous. Connection system said to be the easiest yet invented. No tools needed.

Code: 231-016

£105.00

B | Fundamentals of Electronics

This kit includes solderless electronics breadboard, switches, connection wires, transistors NPN and PNP, red and green light emitting diodes (LED), capacitors, diode and photoresistor, resistors, a buzzer, 9 volt battery and a Teacher's Guide.

Code: R-669100

£105.00

C | Basic Electricity Circuits Kit

Designed as a low-cost, attractive and flexible alternative to the circuit-board approach for pupil investigations into simple circuits. Each component such as a switch, rheostat, bulb holder, etc. is mounted on its own individual plastic panel with 4mm sockets. The panels are then formed into circuits by connecting them together using 4mm stackable leads. This equipment is suited not just to teaching basic concepts about circuits, for key stage 2 students, but also has applications for further study into key stage 3 areas. Each kit is supplied in two polystyrene trays which keep the units organised.

Contents

12 cell holders (without cells); 20 bulb holders; 40 bulbs (4.5V, 0.3A); 12 x 4mm leads, red, 10cm; 12 x 4mm leads black 10cm; 4 x 4mm leads, red, 25cm; 4 x 4mm leads, black, 25cm; 4 rheostat units; 4 universal clips; 8 crocodile clips; 4 silicon diodes; 4 fixed resistors; 8 push switches; 4 changeover switches; 4 electrode holders; 8 soft iron rods; Twelve carbon rods; 50m copper wire, bare, 20swg; 50g Eureka wire, bare, 34swg; 50m insulated copper wire; 1 sheet copper foil 150 X 150mm; 1 pack steel wool; 2 polystyrene storage trays.

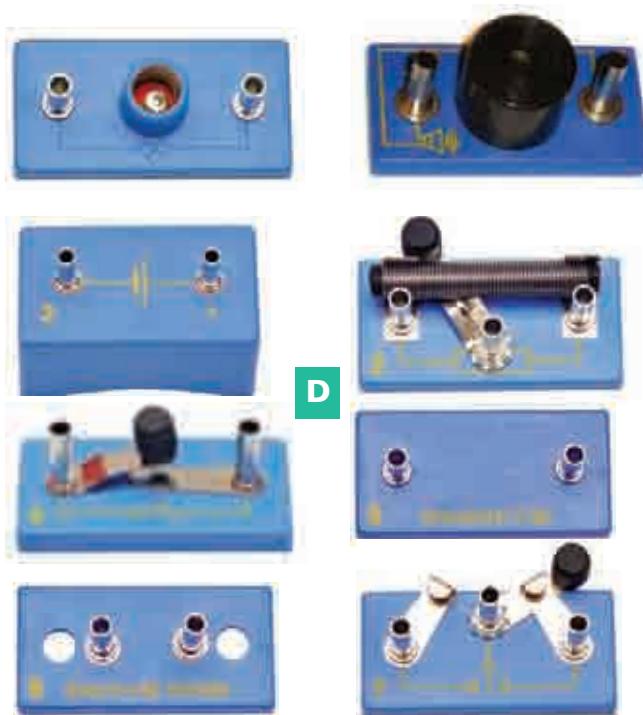
Code: 231-036

£205.00

D Circuits Kit Spares

Spare components for Circuits Kit code 231-036. Components mounted on sturdy panels for ease of use and storage.

Code: 231-038 - Bulb Holder	£3.50
Code: 231-039 - Cell Holder	£3.50
Code: 231-040 - Push Switch	£3.50
Code: 231-041 - Buzzer	£3.50
Code: 231-070 - Rheostat	£3.50
Code: 231-071 - Universal Clip	£3.50
Code: 231-072 - Electrode Holder	£3.50
Code: 231-073 - Changeover Switch	£3.50



E Laboratory 300, Electric Circuit Pupil Set

This is a pupil's set for individual studies and memorizing the basic issues relating to physics and electrical technology at middle school level. Individual creation of simple circuits helps the pupil learn to read schematic diagrams, the basics of the assembly process, and recognition of electrical elements. The work of pupils using this set may be performed according to the detailed instructions enclosed with the set.

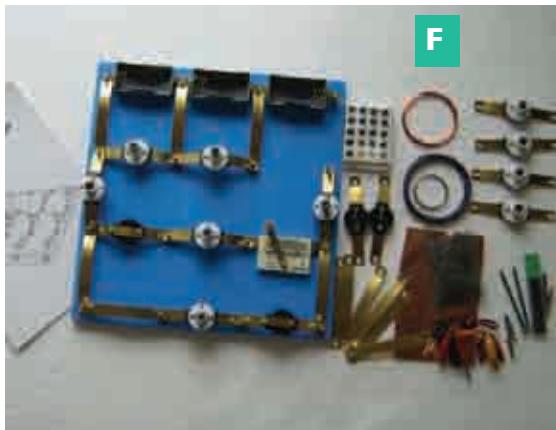
Code: 130-016 **£95.00**

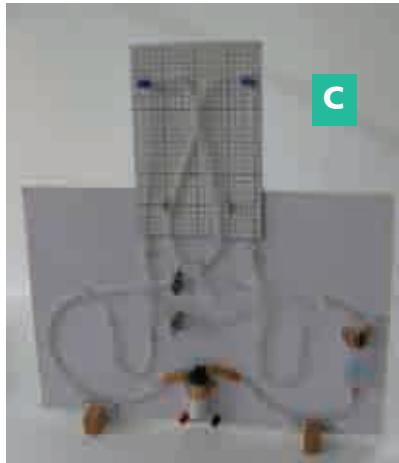


F Worcester Circuit Board

New Worcester circuit board ideal for KS2 and KS3. Strong plastic base and easy to fit metal connectors allow students to conduct a variety of circuit experiments. Manual included.

Code: 231-015 **£89.00**





A

Worcester Circuit Board

This product provides the basis for clear layouts of electrical circuits and reduces the number of connecting leads required. The main component is a base board fitted with cell holders and terminal posts. Also supplied are items for elementary experiments. By the addition of ammeters and voltmeters (not provided) such experiments can be developed to give quantitative results.

The cell holders accommodate three cells which can be used singly or in series combinations. Connections from the cells to the terminal posts are made with coloured leads, each with a 4mm plug on one end and a crocodile clip on the other. Plated and sprung brass straps are used to connect neighbouring terminal posts. These straps are particularly useful when setting up components 'in parallel'. Other connectors include crocodile clips, coloured leads with crocodile clips at both ends, bare and plastic covered copper wire. Included with the baseboard are 1.25V, 0.25A bulbs with holders and straps for connecting to terminal posts. These bulbs can safely be used with 1.5V dry cells, making use of the voltage drop that occurs when current is taken. A 50ohm variable resistor (rheostat) fitted with connection straps, mounted bell pushes (which can double as switches), a fixed resistor, a rectifier (diode), a collection of conducting materials (bare copper wire, resistance wire, pencil leads, steel wool, etc.) and a hardboard disc which can be used with the iron nails provided, as a base board external to the main board.

Suggestions for experiments:

Series and parallel connections of light bulbs, with due regard to the source voltage(s) required.

The use of a light bulb as an indicator of current magnitude
The conducting properties of different conducting materials
The control of currents using switches and the variable resistor
The properties of a variable resistor (rheostat) and a rectifier (diode). For more advanced students these investigations can have a quantitative basis if suitable measuring instruments (voltmeter and ammeter) are available.

Code: EDU099

£95.00

B

Electricity Poster, 890 x 584mm

Striking illustrations and informative text on key electricity concepts. Learn about the sources of electricity; electrical circuits; power plants; and much more. Graphical depiction combines illustrations with stunning photography and illuminating background text.

Code: 44-35-1131

£29.00

C

Electric Circuit Simulator Water Circuit Board

A working model which uses water to simulate an electric circuit and to assist in the understanding of the invisible nature of electricity. Water is pumped around a simple circuit to demonstrate movement of charge, resistors, an ammeter and a voltmeter. Instructions included. Size: 590 x 320 mm.

Code: 231-033

£95.00

D Electricity & Electromagnetism CD

Explore electricity and electromagnetism! Your class will conduct virtual experiments to grasp the basic principles behind these fascinating topics. Coverage includes the definition and concepts of an electric charge; movement of charges through electric fields; potential differences; electric flux; Ohm's law; electromagnetic force; solenoid, relays and motors; and much more. Superb graphics and animation make these complex topics clear and easy to understand! Minimum System Requirements: Windows 98 to 2000. 64MB RAM.

Code: 13-1141

£135.00



E Microscience Basic Electricity Kit

This kit provides students working on an individual basis with an opportunity to study the basic principles of electricity. Topics covered with the kit include:

Batteries & Current Flow; Circuits: Direction; Series & Parallel; Circuits; Magnetic Effects & Chemical Reactions; Electricity in the Home.

Code: 310-015

£29.50



F Electricity Economy Kit

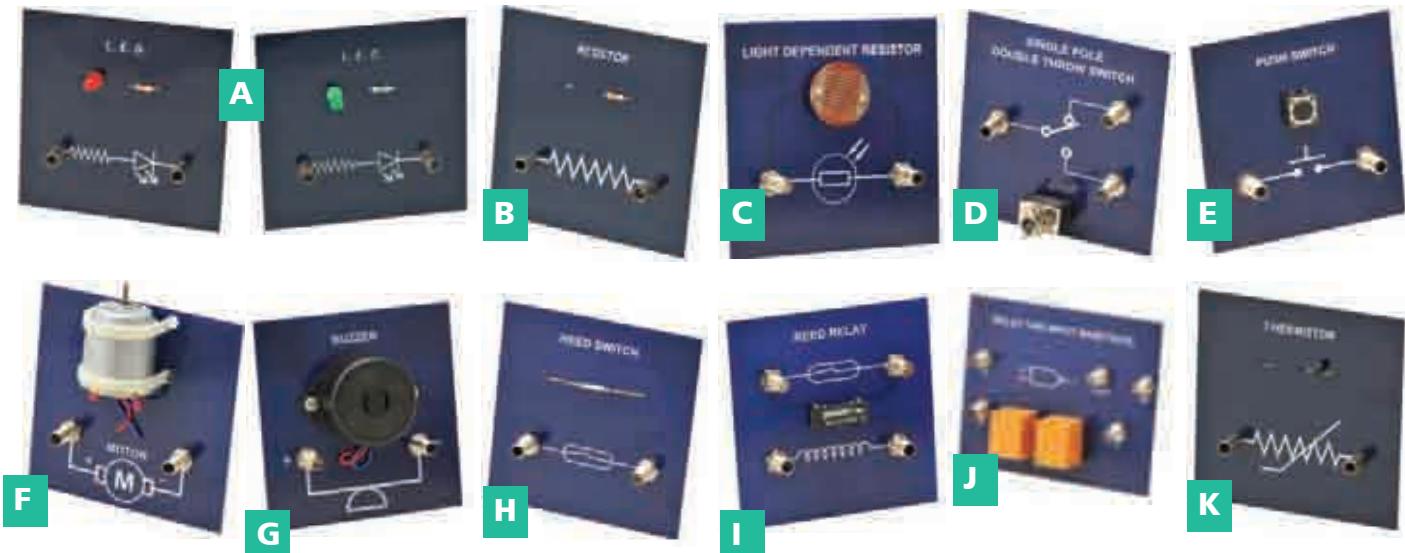
Basic assortment of components suitable for introductory electronics. Kit consists of:

10 x Crocodile Leads; 3 x 1.5V Cell Holders; 5 x DPDT Slide Switch; 10 x MES Lampholders; 10 x MES Bulbs; 1 x 6V Buzzer with connecting leads; 1 x 3-6V Electric Motor.

Code: EDU1036

£22.00





Simple Circuit Modules:

A LED Boards

Large light emitting diodes with series resistor of 220ohms for p.d.'s of upto 6V.

Code: 231-048 - Red **£5.00**

Code: 231-049 - Green **£5.00**

B Resistor

Fitted with 4mm plugs

Code: 231-050 **£5.00**

C Light Dependent Resistor Board

An ORP13 light dependent resistor, fully covered resistor of 10 ohms. In normal room conditions resistance of 250 ohms approx.

Code: 231-051 **£5.00**

D Single Pole Double Throw Switch

Single pole double throw switch on base.

Code: 231-052 **£5.00**

E Push Switch

On base, an on/off push button switch.

Code: 231-053 **£5.00**

F Motor

On base. A low-voltage d.c. motor with series resistor to limit current consumption.

Code: 231-054 **£5.00**

G Buzzer

On base. A low current buzzer of 2mA approx. capacity.

Code: 231-055 **£5.00**

H Reed Switch

A heavy duty on/off reed switch fitted on base.

Code: 231-056 **£5.00**

I Reed Relay

A current through the coil produces magnetism to cause the reed to switch another circuit. The reed contacts are protected from short circuit damage by series resistor.

Code: 231-057 **£5.00**

J Relay NAND Gate

Relay two input NAND gate, mounted on base.

Code: 231-058 **£8.00**

K Thermistor Unit

Thermistor Unit, mounted on base.

Code: 231-060 **£5.00**

Lamp Holder (NOT SHOWN)

4.5V / 0.3A bulb in a holder.

Code: 231-059 **£5.00**

L Crocodile Clips, 50mm

Steel nickel plated.

Code: 17-0340 - Pack of 25

£8.50



M Crocodile Leads

460mm leads with a crocodile clip at each end. Available in packs of 10 containing 5 assorted colours or packs of 20 containing red and black.

Code: 231-082 - Pack of 10

£1.95

Code: 231-083 - Pack of 20

£2.50



N Stackable Leads

4mm stackable lead. 500mm length.

Code: 17-0380 - Red

£2.50

Code: 17-0385 - Black

£2.50

Code: 17-0386 - Yellow

£2.50



O Stackable Test Leads, 100mm

100mm test leads fitted with a 2mm stackable connector at each end. Available in red or black.

Code: 231-074 - Red

£0.85

Code: 231-075 - Black

£0.85



P Stackable Test Leads, 500mm

500mm banana plug test leads fitted with a 4mm stackable connector at each end. Available in red or black.

Code: 231-076 - Red

£0.50

Code: 231-077 - Black

£0.50



Q Stackable Plug to Miniature Shrouded Crocodile Clips

500mm test leads fitted with a 4mm stackable connector and a crocodile clip. Available in red or black.

Code: 231-078 - Red

£0.60

Code: 231-079 - Black

£0.60



R Stackable Test Lead with Retractable Shrouds

1m test leads fitted with stackable 4mm connectors at each end. The connectors have a retractable shroud for extra safety. Available in red or black.

Code: 231-080 - Red

£2.50

Code: 231-081 - Black

£2.50





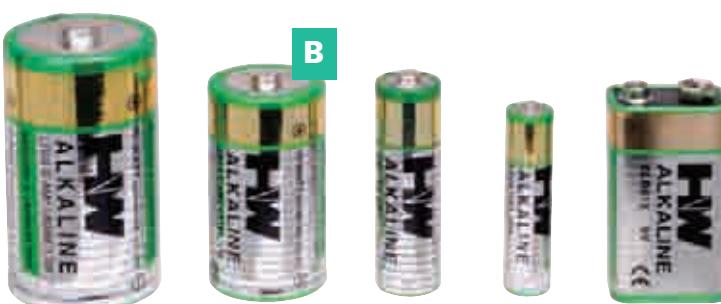
A

A

Zinc Carbon Batteries

A range of heavy duty zinc chloride batteries available in AAA, AA, C, D and PP3 sizes.

Code: 231-100 - AAA	£0.10
Code: 231-101 - AA	£0.10
Code: 231-102 - C	£0.15
Code: 231-103 - D	£0.30
Code: 231-104 - PP3	£0.30



B

B

Alkaline Batteries

A range of alkaline batteries available in AAA, AA, C, D and PP3 sizes. Alkaline batteries have a higher capacity than zinc chloride types so are better suited to high power applications.

Code: 231-105 - AAA	£0.20
Code: 231-106 - AA	£0.20
Code: 231-107 - C	£0.60
Code: 231-108 - D	£0.75
Code: 231-109 - PP3	£0.85



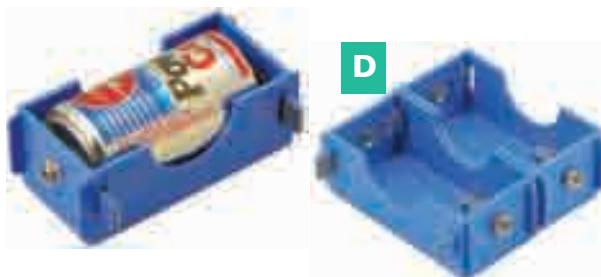
C

C

Coin Cell Battery

A 3V lithium coin cell with 200mAh capacity. 20mm dia.

Code: 231-110 - CR2032	£0.65
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D

D

Stackable Cell Holders

Designed to link together in parallel or series to extend capacity or voltage. Supplied singly.

Code: 231-042	£0.95
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E

E

Cell Holders on Base

Cell Holder for D-size Battery, fitted on base with 4mm Sockets

Code: 231-043 - 1 x D cell	£2.50
Code: 231-044 - 2 x D cell	£5.00

F Cell Holders

Provides 1.5,3,4.5 and 6 Volts DC power and has 4mm sockets for safety. Needs 4 D-cell batteries.
Supplied without batteries.

Code: 231-045

£12.00



F

G Battery Holders

A range of battery holders to suit AAA and AA batteries. Press stud type are compatible with a standard PP3 battery clip. Tag type allows you to fix your own wires or use crocodile clips to make a connection.

Code: 231-111 - Long, 4 x AA	£0.35
Code: 231-112 - Short, 4 x AA	£0.35
Code: 231-113 - Press Stud, 2 x AA	£0.25
Code: 231-114 - Studs, 3 x AA	£0.45
Code: 231-115 - Tags, 3 x AA	£0.35
Code: 231-116 - 1 x AA	£0.20



G

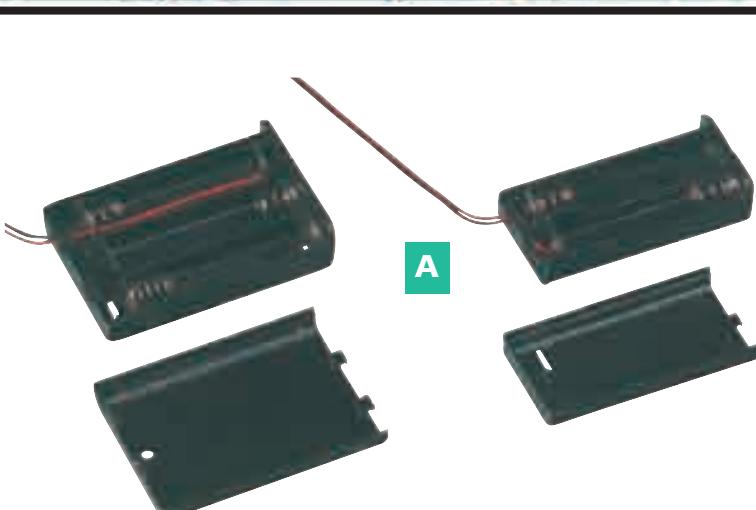
H Battery Holders with Flying Leads

These battery holders for AAA, AA and PP3 batteries are fitted with 150mm of wire.

Code: 231-117 - 1 x AA	£0.25
Code: 231-118 - 2 x AA	£0.25
Code: 231-119 - 2 x AAA	£0.25
Code: 231-129 - 1 x PP3	£0.25



H



A Battery Box with Switch

These battery boxes for AAA and AA batteries are fitted with 150mm of wire and have a built-in switch for ease of use. Supplied with removable lid.

Code: 231-123 - 2 x AAA	£0.45
Code: 231-124 - 3 x AAA	£0.65
Code: 231-125 - 2 x AA	£0.45
Code: 231-126 - 3 x AA	£0.80
Code: 231-127 - 4 x AA	£0.65



B Coin Cell Holder

A PCB mounting coin cell battery holder for use with CR2032 size cells.

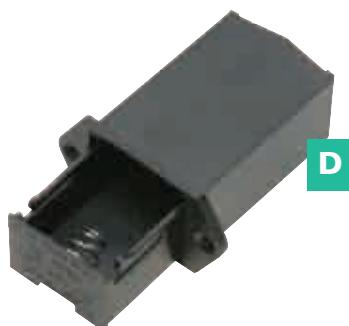
Code: 231-128	£0.40
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C PCB Battery Holder

These battery holders for AAA, AA and PP3 batteries are fitted with pins which allow them to be soldered directly to a PCB.

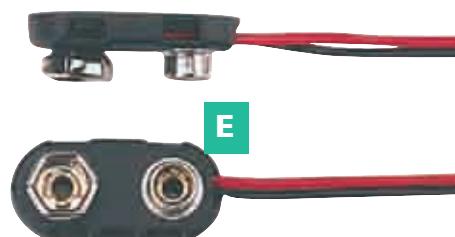
Code: 231-120 - 2 x AAA	£0.15
Code: 231-121 - 2 x AA	£0.20
Code: 231-122 - 1 x PP3	£0.20



D Enclosed Battery Holder

This PP3 battery box has a sliding drawer which fully conceals the battery when in use.

Code: 231-130	£0.95
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E Battery Clip

A standard PP3 battery clip with 150mm leads. Can be used with PP3 batteries or press stud type battery holders.

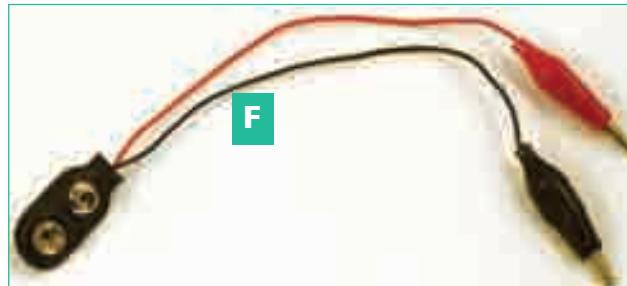
Code: 231-131	£0.15
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F Battery Snaps with Crocodile Leads

Battery connector with crocodile clips attached for easy connection.

Code: 310-041

£2.00



G Insulated Socket Terminals

For panel mounting, captive insulated head with 4mm socket, nuts and washers.

Code: PH1042A - Pack of 50, Black **£19.95**

Code: PH1042B - Pack of 50, Red **£19.95**

Code: PH1042C - Pack of 50, Yellow **£19.95**



H Component Holders

Pack of mounted clips to hold components in Physics investigations.

Code: 231-034 - Pack of 8 **£19.95**



I Electrode Holders

Plastic strip with 4mm socket terminals and two crocodile clips to hold electrode rods and foils in place during use.

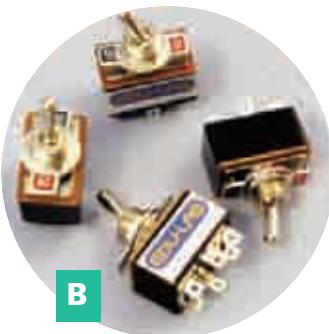
Code: EDU1092 - Rods, Pack of 5 **£19.95**

Code: EDU1125 - Foils, Pack of 5 **£21.00**





A



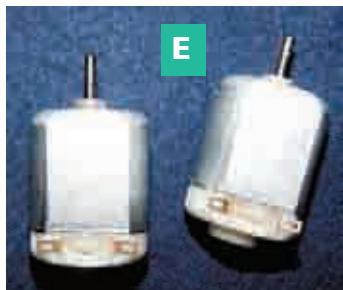
B



C



D



E

A Economy Switches

Economy switch with Farnsworth clips.

Code: EDU731 - Pack of 25

£27.00

B DPDT Toggle Switches

Rated at 250V, 1.5A A/C.

Code: EDU764 - Pack of 10

£15.00

C Contact Key

A single contact key mounted on base. Comprising a plated spring arm with press knob, a contact stud, plated connecting strip and 4mm terminals.

Code: PH0986

£6.00

D Knife Switches on Bases

A range of knife switches mounted on plastic bases, suitable for use in electricity circuits. The poles and blades are made of brass to ensure good electrical connections.

Code: PH1000A

£2.75

- Single Pole, Single Throw

£2.75

Code: PH1000B

£2.75

- Single Pole, Double Throw

£2.75

Code: PH1002A

£2.75

- Double Pole, Single Throw

£2.75

Code: PH1002B

£2.75

- Double Pole, Double Throw

E Electric Motors

A low-cost miniature DC motor suitable for many applications including models, robotics and educational demonstration equipment. The two flat sides make the motor ideal for mounting on a PCB. Rotates counter clockwise when viewed from the shaft end. Solder tag termination. Operating voltage 1.5 to 4.5V DC. Dia: 20mm; Shaft length: 9mm; Shaft Diameter: 2mm; Weight: approx 17g; Width across flats: 15mm.

Code: EDU765 - Pack of 5

£4.50

F MES Lamp Bulbs

A range of standard MES lamps in various voltages.

Code: 231-091 - 1.5V	£0.10
Code: 231-092 - 2.5V	£0.10
Code: 231-093 - 6V	£0.10
Code: 231-094 - 12V	£0.10



F

G

G MES Bulbholder

Lamp holder for MES type lamps. Screw terminals to allow wires to be easily attached. 10mm fixing centres.

Code: 231-090	£0.20
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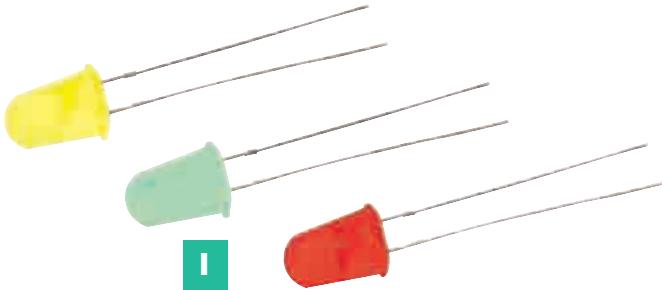


H

H Lamp Holder

Lamp Holder fitted with MES type bulb holder and terminals.

Code: 231-046	£2.50
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I

I LEDs, 5mm

Standard 5mm LEDs available in a range of colours.

Code: 231-084 - Red, Pack of 100	£3.50
Code: 231-085 - Bright Red, Pack of 100	£3.95
Code: 231-086 - Yellow, Pack of 100	£3.95
Code: 231-087 - Green, Pack of 100	£3.95
Code: 231-088 - Blue, Pack of 100	£8.95
Code: 231-089 - White, Pack of 100	£8.95

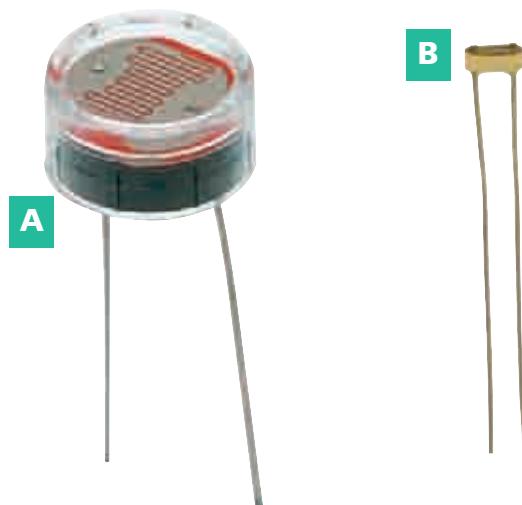


J

J LED Pack

A pack containing an assortment of 680 LEDs and an LED tester. Supplied in an easy to store Gratnells tray.

Code: 231-095	£32.00
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A NORPS 12 LDR

This Light Dependent Resistor is housed in a robust clear plastic case. Dark resistance of $1M\Omega$.

Code: 231-098

£0.70

B Miniature LDR

This miniature Light Dependent Resistor is housed in an epoxy package. Dark resistance of $1M\Omega$.

Code: 231-099

£0.20



C Capacitor Pack

A pack containing an assortment of popular electrolytic and polyester capacitors.

Contents:

- 1x Metal polyester capacitor kit (pack 110)
- 1x Electrolytic capacitor kit (pack 93)
- 5x $470\mu F$ 16V Axial electrolytic
- 10x $2.2\mu F$ 63V Axial electrolytic
- 3x $1000\mu F$ 16V Axial electrolytic
- 10x $1\mu F$ 63V Axial electrolytic
- 3x $1000\mu F$ 25V Axial electrolytic
- 10x $4.7\mu F$ 63V Axial electrolytic
- 2x $2200\mu F$ 16V Axial electrolytic
- 15x $10\mu F$ 25V Axial electrolytic
- 5x $22\mu F$ 25V Axial electrolytic
- 10x $47\mu F$ 25V Axial electrolytic
- 15x $100\mu F$ 16V Axial electrolytic
- 5x $220\mu F$ 16V Axial electrolytic

Code: 231-097

£31.00



D Resistor Pack

A pack containing an assortment of fixed resistors and potentiometers in commonly used values. Supplied in an easy to store Gratnells tray.

Contents:

- 1x Carbon film resistor kit 0.25W (pack 1000)
- 1x carbon film resistor kit 0.5W (pack 1000)
- 5x 10K Log Potentiometer
- 5x 47K Log Potentiometer
- 5x 4K7 Linear Potentiometer
- 5x 100K Log Potentiometer
- 5x 10K Linear Potentiometer
- 1x Preset Potentiometer (pack 110)
- 5x 47K Linear Potentiometer
- 5x 100K Linear Potentiometer
- 5x 4K7 Log Potentiometer

Code: 231-096

£36.25

E Resistance Coils

Resistance units to add to any circuit for basic electrical experiments. Instead of using simple resistors these blocks provide convenient connections to a resistance by means of 4mm sockets.

Code: PH1143A - 1Ω	£4.25
Code: PH1143B - 2Ω	£4.25
Code: PH1143C - 5Ω	£4.25
Code: PH1143D - 10Ω	£4.25
Code: PH1143E - 20Ω	£4.25
Code: PH1143F - 50Ω	£4.25
Code: PH1143G - 100Ω	£4.25
Code: PH1143H - 200Ω	£4.25



E



F

F Jockey with Insulated Handle

For Wheatstone Bridge and Potentiometer work. Insulated handle with plated brass contact and 4mm plug terminal. Overall length: 100mm.

Code: P1162	£10.00
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F

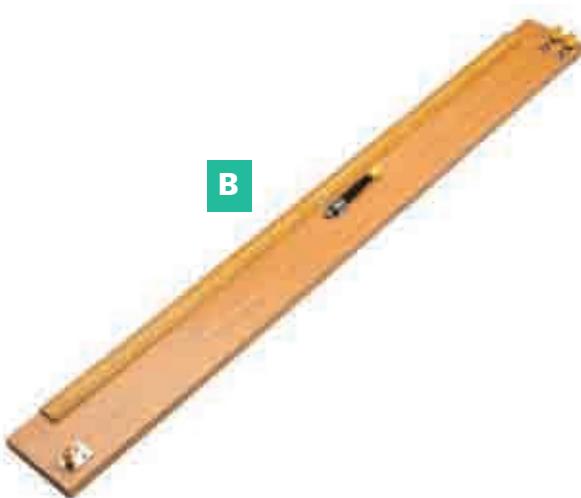
G Wheatstone Bridge

This Wheatstone bridge has broad, heavily plated brass strips mounted on a polished hardwood base. Terminals with 4mm sockets are provided. The 24 SWG constantan wire is stretched along the top of a metre scale in mm and cm. Supplied with jockey. Dimensions: 1130 x 80 x 50mm.

Code: PH1156A - 2 gap	£47.00
Code: PH1156B - 4 gap	£55.00



G



A Potentiometer Modules

Rotary linear potentiometer mounted on a channel box. Choice of values. Connection made to 4 mm sockets. Protection against student's wrong connection by means of fast blow fuse.

Wire wound types:

Code: 231-138 - 25Ω	£19.00
Code: 231-139 - 100Ω	£19.00
Code: 231-140 - 1KΩ	£19.00
Code: 231-141 - 5KΩ	£19.00
Code: 231-142 - 10KΩ	£19.00
Code: 231-143 - 25KΩ	£19.00
Carbon Track types:	
Code: 231-144 - 50KΩ	£17.00
Code: 231-145 - 100KΩ	£17.00

B Single Wire Potentiometer

New design with protective cover. Wound upon a tube with heavily oxidised resistance wire. Fitted with 4mm safety socket terminals. Resistance $\pm 10\%$ compared to nominal value.

Code: PH1160A **£36.00**

C Decade Resistance Box

This decade resistance substitution box provides 3 decade ranges from 0 to 11,110 ohm with a resolution of 1 ohm. Each decade is selected by a rotary switch. Tapping points are provided across each range to allow the unit to be used as an accurate potential divider. All resistance values are $\pm 2\%$ with a rating of 0.25W maximum per range.

Code: DRBOX3 - 3 Ranges	£62.00
Code: DRBOX4 - 4 Ranges	£72.00
Code: DRBOX5 - 5 Ranges	£82.00

D Rheostats

A high quality rheostat offering excellent value for money. Wound with heavily oxidised resistance wire on a vitreous enamel steel tube with the winding, which is supported on robust diecast end stands. The heavy duty sliding contact is of multi-leaf phosphor bronze, nickel plated for corrosion resistance. 4mm terminal posts are fitted, facilitating external connection with a conventional 4mm plug.

Code: ORH0002 - 2.5Ω, 9.0A	£37.00
Code: ORH0004 - 4.5Ω, 9.0A	£40.00
Code: ORH0008 - 8.5Ω, 5.0A	£30.00
Code: ORH0016 - 16Ω, 4.0A	£30.00
Code: ORH0020 - 20Ω, 4.5A	£40.00
Code: ORH0037 - 37Ω, 3.2A	£40.00
Code: ORH0055 - 55Ω, 2.3A	£30.00
Code: ORH0125 - 125Ω, 1.8A	£40.00



Code: ORH0135 - 135Ω, 1.4A	£27.00
Code: ORH0280 - 280Ω, 1.3A	£36.00
Code: ORH0300 - 300Ω, 0.9A	£27.00
Code: ORH0600 - 600Ω, 0.6A	£30.00
Code: ORH1325 - 1325Ω, 0.5A	£36.00
Code: ORH1600 - 1600Ω, 0.3A	£30.00

E Rheostat

Open type rheostat with metal/bakelite supports. Length: 300mm.

Code: PH1144D-16 - 16Ω, 4.2A	£21.00
Code: PH1144D-20 - 20Ω, 4.2A	£18.00



F Platinum Resistance Thermometer

Platinum resistance thermometer for showing the principles of platinum resistance thermometry and accurate temperature measurement. Suitable for temperatures below 150 degrees C. Fine platinum wire of 2 Ohms resistance wound non-inductively on a mica frame and soldered to copper leads. Base has 4mm socket terminals.

Code: PH0425	£99.00
---------------------	---------------





Approx size comparisons			
mm	swg(nearest)	mm	swg(nearest)
2.00	14	0.56	24
1.60	16	0.45	26
1.25	18	0.40	28
0.90	20	0.31	30
0.71	22	0.28	32

A**Bare Copper Wire**

Bare copper wire in various gauges.
250g or 500g per reel as listed.

Code: PH1058A - 2mm, 500g	£15.75
Code: PH1058B - 1.6mm, 500g	£15.75
Code: PH1058C - 1.25mm, 250g	£8.95
Code: PH1058D - 0.9mm, 250g	£8.95
Code: PH1058E - 0.71mm, 250g	£8.95
Code: PH1058F - 0.56mm, 250g	£8.95
Code: PH1058G - 0.45mm, 250g	£8.95
Code: PH1058H - 0.40mm, 250g	£8.95
Code: PH1058I - 0.31mm, 250g	£11.00
Code: PH1058J - 0.28mm, 250g	£11.00

**B****Bare Eureka/Constantan Wire**

A copper nickel alloy of low temperature coefficient suitable for resistance coils. 125g per reel.

Code: PH1066A - 1.6mm, 125g	£11.00
Code: PH1066B - 1.25mm, 125g	£11.00
Code: PH1066C - 0.9mm, 125g	£11.00
Code: PH1066D - 0.70mm, 125g	£11.00
Code: PH1066E - 0.55mm, 125g	£11.00
Code: PH1066F - 0.45mm, 125g	£11.00
Code: PH1066G - 0.40mm, 125g	£11.00
Code: PH1066H - 0.31mm, 125g	£11.00
Code: PH1066I - 0.28mm, 125g	£11.00
Code: PH1066J - 0.25mm, 125g	£11.00

**C****Bare Nichrome Wire**

Nichrome wire in various gauges. 125g per reel.

Code: PH1064A - 1.25mm, 125g	£13.00
Code: PH1064B - 0.9mm, 125g	£14.00
Code: PH1064C - 0.70mm, 125g	£14.00
Code: PH1064D - 0.56mm, 125g	£14.00
Code: PH1064E - 0.45mm, 125g	£15.00
Code: PH1064F - 0.40mm, 125g	£16.00
Code: PH1064G - 0.31mm, 125g	£16.00
Code: PH1064H - 0.28mm, 125g	£17.00

D Solar Cell Unit

Solar cell unit comprising a solar cell mounted on a base with 4mm socket terminals for electrical output.

Code: PH1320 £32.00



E Mini Motor Unit

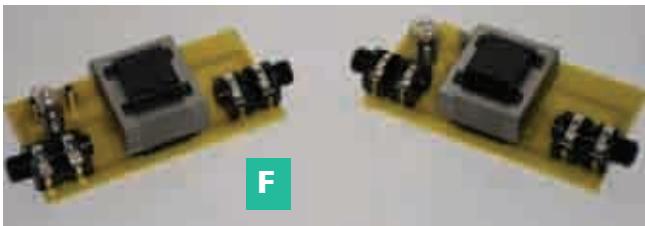
For use with Solar Cell Unit (code: PH1320). A small motor which operates from 1.5 to 4.5V DC.

Code: PH1319 £21.00

F National Grid Simulation Mini

The system comprises two printed circuit boards fitted with step up/step down transformers, 4mm low voltage connectors, "high voltage" jack sockets, 2.5V MES lamps and a set of "HT" leads. The system is classified as Safety Electrical Low Voltage - in other words it does not generate harmful voltages and is safe for pupil use. The system allows the pupil to investigate the effect of stepping up the voltage to transmit power, as used in the National Grid. All it requires are two 4mm plugged leads and a 2V ac power source. Comes complete with a 1.2m long set of transmission cables and full instructions.

Code: 231-133 £51.00



G National Grid Kit

This new kit has been developed to safely demonstrate the need for high voltage transmission. It has the following features: Touchproof, locking high voltage connectors used throughout - it is virtually impossible to get an electric shock. The clear casing lid enables pupils to see how it works and trace the circuit. Indicators for low/high voltage. The resistance wires can be connected to either the high or low voltage system for direct comparison of lamp brightness/energy losses. By gripping the insulated cables, students can feel when and where the energy is being lost, mainly as heat. Voltmeter sockets for measuring the high voltage. Comes complete with two boxes (transmit and receive), insulated resistance wires, two mounted SBC lamps and full instructions. Two Pylon kits with glue and instructions available separately.

Code: 231-132 £117.00

Code: 231-134 - 2 Pylon Kit £11.75



MAGNETISM

A



B



C



A

Magnetics Kit

Help students understand the force of magnetism with these exciting experiments including classifying magnetic and non-magnetic materials, what attracts and repels, magnetic force through solids, how compasses react to a magnetic field and more. Includes a Teacher's Guide and material for five students.

Code: 4006

£105.00

B

Magnetism Poster, 890 x 584mm

A graphical summary of this key topic. Provide your students with a visual summary which provides insight into what is magnetism; the type of magnets that exist; the concept of attraction-repulsion; magnetic fields; Earth's natural magnetism; and much more.

Code: 44-35-1126

£29.00

C

Magnetism Activity Kit

Consists of 5 anisotropic ferrite magnets, a rod, screw-on caps and washers. Instructions included. Easy-to-use kit demonstrates N & S pole, levitation by repulsion, strength and distance, how to make a stronger magnetic field, magnetic fields through liquids, solids and gases.

Code: 221-001

£52.00

D Metal Discs

Metal discs each stamped with the metal name. Consists of: brass, copper, bronze, nickel, mild steel, stainless steel, zinc and aluminium. 25mm diameter.

Code: EDU149 - Set of 8 £4.50
Code: EDU150 - Set of 16 (8 unstamped) £8.00



E Metal Strips

A set of twelve metal strips for magnetism experiments. Each strip is stamped with a key letter for easy identification. The set contains magnetic and non-magnetic metals.

Code: EDU889 £6.85



F Magnetism Studies, Materials Collection

A collection of twenty various magnetic and non-magnetic materials for teaching the principles of magnetism.

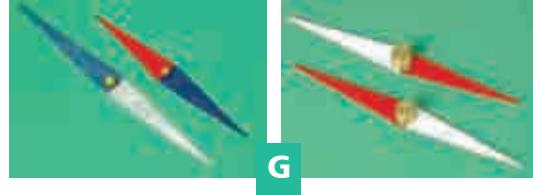
Code: 221-003 £18.00



G Magnetic Needles

Carbon steel needle with jewel or brass pivot bearing.

Code: MGND50 - 50mm, Jewel	£1.75
Code: MGND75 - 75mm, Jewel	£1.75
Code: MGND100 - 100mm, Jewel	£2.75
Code: P816A - 50mm, Brass	£1.25
Code: P816B - 75mm, Brass	£1.50
Code: P816C - 100mm, Brass	£1.95

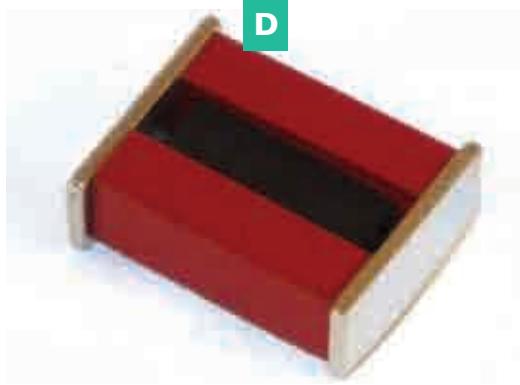


H Magnetic Needle Stands

Non-magnetic metal pillar with carbon steel point, on stable base, of overall height 110mm

Code: P818 - Metal	£3.75
Code: P818A - Plastic	£3.00





A

Economy Plotting Compass

Dial marked with the cardinal and ordinal points of the compass. Glass faced on one side in aluminium case. 16mm diameter.

Code: PH0820A - Pack of 10

£2.50

B

Plotting Compass

Glass faced on both sides, mounted in aluminium ring of 20mm diameter. Provided with a durable plastic case for storage.

Code: PH0822 - Pack of 10

£4.50

C

Magnet Bar & Keeper

Chrome steel bar magnets packed in pairs with keepers. Coloured half red, half blue.

Code: PH0786A - 37x12x5mm

£3.15

Code: PH0786B - 50x12x5mm

£3.15

Code: PH0786C - 75x12x5mm

£4.00

Code: PH0786D - 100x12x5mm

£5.00

Code: PH0786E - 150x12x5mm

£6.00

D

Alnico Magnet Bar & Keeper

ALNICO magnets. Dimensions are nominal. Boxed in pairs with keepers. 13mm or 15mm thick.

Code: PH0787A - 37x13x10mm

£6.30

Code: PH0787B - 50x13x10mm

£8.50

Code: PH0787C - 75x13x10mm

£12.00

Code: PH0787D - 100x13x10mm

£14.00

Code: PH0787E - 150x13x10mm

£18.00

Code: PH0788A - 37x15x10mm

£7.00

Code: PH0788B - 50x15x10mm

£8.95

Code: PH0788C - 75x15x10mm

£9.95

Code: PH0788D - 100x15x10mm

£16.80

Code: PH0788E - 150x15x10mm

£21.00

E Magnetising & Demagnetising Coil

A solenoid wound with insulated copper wire and mounted on a base, complete with switch and 4mm socket terminals. Low voltage, suitable for magnetising and demagnetising ordinary magnets, iron bars, strips etc.

Code: PH0804

£142.00



E

F Re-magnetiser

Re-magnetiser for bar and horseshoe magnets. No electricity required.

Code: 221-800

£47.00



F

G Parallel Foil Bar

A neat and effective way of supporting foil strips when demonstrating the attraction and repulsion of current-carrying conductors.

Code: 260-719

£11.50



G

H Floating Magnets - Coloured

A set of 5 ceramic magnets, of 32mm external diameter, mounted on a 150mm high wooden pole. Demonstrates magnetic repulsion forces.

Code: PH0797A

£4.25



H



A

Galvanometer - Tangent

The plastic ring or bobbin, 162.5 mm overall diameter wound with three coils of insulated copper wire with 2, 50 and 500 turns mounted on bakelite moulded platform fitted with 4 terminals, rotating on a tripod non-magnetic metal base, supported by levelling screws. Complete with compass box (Magnetometer) mounted at the centre of the ring.

Code: 221-006 - 37x12x5mm

£35.00



B

B

BIL Coil

A heavy-duty printed circuit coil measuring 110 x 85mm on an aluminium handle gives 5 or 10 turns. It can be placed between the poles of a permanent magnet on the top pan of a chemical balance so that when a current is passed through the coil a force is exerted on the magnet due to the magnetic effect of the current. Quantitative measurements can be taken to investigate the formula $F = BIL$.

Code: 100-170

£52.00



C

C

'C' Cores with Clip

Double 'C' core and holding clip. A laminated, rounded-rectangle core with square cross-section, which has been cut across the middle to produce two equal C's with square, bare-metal meeting faces. A spring steel clip is provided to hold them together.

Code: CCORE2 - Set of 2

£24.00

D Magnetic Field Demonstrator

Ever tried removing iron filings from a magnet? This is the perfect solution for previously messy magnetic field line demonstrations, clearly revealing the field lines in 1, 2 or 3 dimensions without the need for loose iron filings. Equally suited for demonstration purposes and students' experiments.

Code: PH0803

£39.00



D

E Magnetic Field Apparatus

A set of 3 perspex-mounted wire arrangements designed to demonstrate the electromagnetic fields generated by a current passing through a conductor.

A) Single conductor type:

A rectangular loop of wire 1.5mm diameter capable of carrying a maximum 8A current. Either sprinkled iron filings or a plotting compass is placed around the vertical wire to show the magnetic field emitted around a current carrying wire.

B) Single and 5 turn flat coil:

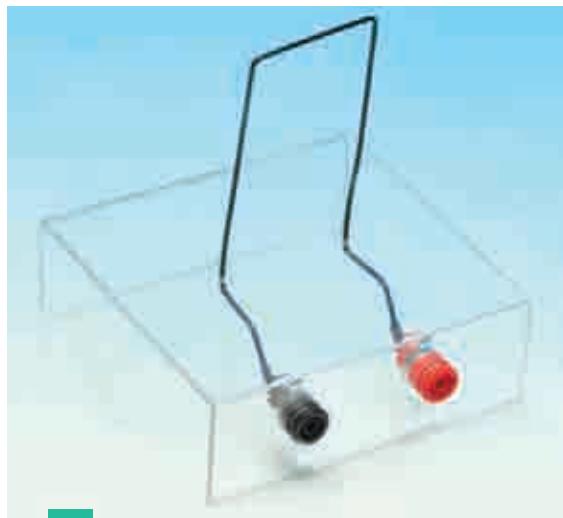
Both coils have a 62mm diameter of 1.5mm copper wire. The single turn will take 8A and the 5 turn is restricted to 5A.

C) Open Helix Coil:

Consists of 14 turns of 1.5mm diameter copper wire open wound on a clear base. Coil 51mm diameter x 92mm length.

Code: EDU143 - Pack of 3

£110.00

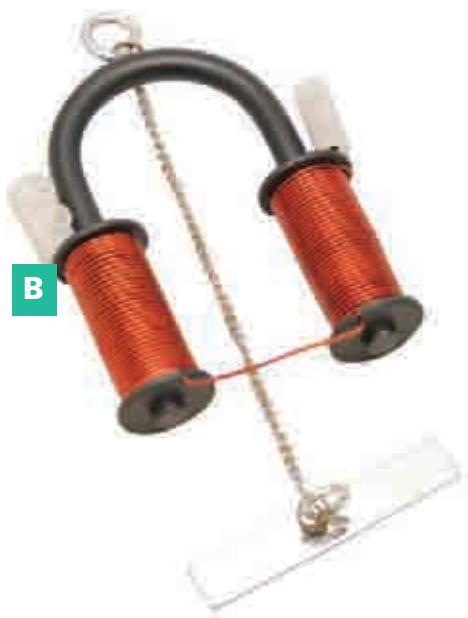


E



E

ELECTROMAGNETISM

Electromagnetic Spectrum Chart
850 x 610mm

We live in a sea of waves. With this exciting visual aid, students can explore the unique relationship between the unseen electric and magnetic waves surrounding us. See the difference between wavelength and frequency scales in addition to understanding radio and microwave usage, x-ray and gamma ray absorption and much more! Accompanied by an explanatory sheet.

Code: 4100

£19.95

Electromagnet

U-shaped core of circular section with armature and carrying hook. Wound with insulated copper wire and provided with barrel connections for use with 4-6 volts DC. Complete with keeper. 110 x 9mm (dia).

Code: MBEM

£8.50

Electromagnet Investigation

A robust system allowing students to study the effect of current and number of coils on the strength of an electromagnet. Tapping at 100, 200, 300, 400, 500, 600 turns. The weights used are large paper clips. A variable DC low voltage supply is required

Code: 960-114

£42.00

D Westminster Electromagnet Kit

A comprehensive kit containing the essential items for basic experiments in electromagnetism. General investigation of Magnets, Eddy Current, Force Between Currents and Investigation of the Magnetic Field, are just some of the basic experiments that can be carried out with this kit.

Comprises:

8 anisotropic alloy magnets; 8 anisotropic ceramic ferrite magnets; 4 steel magnetic yokes; 6 plotting compasses; 5 hardboard formers of compasses; 1 bottle iron filings; 4 each double C Cores; clips for C Cores; aluminium rings; split aluminium rings; 4 support bases; armatures with axle rods; 8 split pins; 16 rivets; 1 length latex rubber tubing; 4 each formers of coils; reels of tape; reels of copper wire; 4 sheets of white paste board; plain postcards; reels of white cotton; 4 carbon resistors, 100Ω ; flash lamp bulbs; 5 neon bulbs; 8 MES bulb holders; wood clamp; wood block.

Code: KEM007320

£245.00



D

E Electromagnetic Power Supply

Low voltage, high current power supply for use with Westminster electromagnetic kits, Fleming's apparatus etc. 1-0-1V nominal AC, allows students access to 1V output, or 2V DC output furnished by rectification of 2V AC (unsmoothed). Short circuit current is 10A. Transformer is protected by thermal fuses and slow-blow fuse 40A Shottky barrier diode for robust and efficient rectification.

Specifications:

Input voltage : 230V $\pm 10\%$ 50Hz
 Outputs: 1-0-1V a.c., 2V d.c. nominal
 Dimensions: 208 x 155 x 115mm (W x H x D)
 Height including handle is 187mm.

Code: 605-008

£105.00



E

F Lenz's Law - open & closed loop

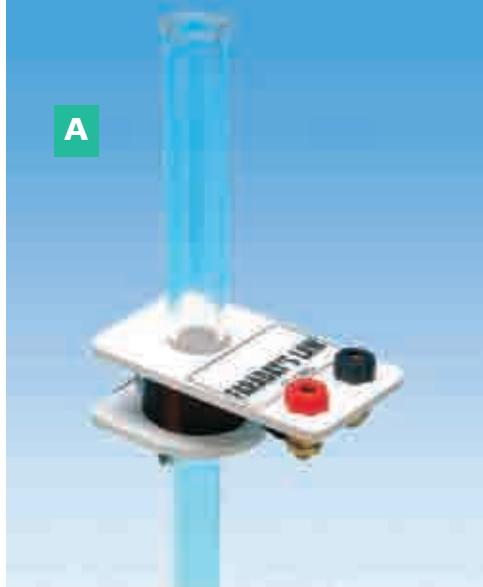
Teaches Faraday's law of induction as well as Lenz' Law. Show how passing a magnet through a complete loop causes the device to move. No movement at all occurs when using the split loop.

Code: 221-005

£15.00



F



A

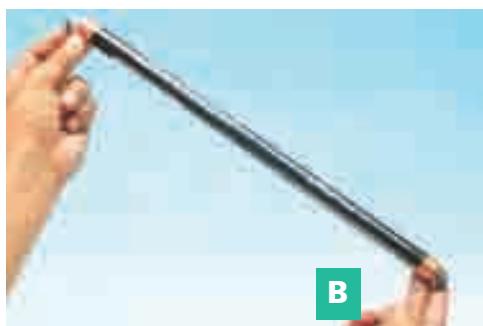
A

Faraday's Law Apparatus

An acrylic assembly holding a 100 turn coil with 4mm socket connections which can slide on a 300mm long, 15mm diameter acrylic tube. A small cylindrical magnet can be dropped down the tube so that a pulse of electricity is generated in the coil as it passes through. An oscilloscope is used to monitor the pulse and measure its amplitude. At different speeds the amplitude varies and can be used by A-Level students to investigate Faraday's Law while revising equations of motion to determine the speed. An alternative approach is that of an open investigation to study the amplitude as a function of coil position which should lead to similar results. Ideal for use with PC-based oscilloscopes.

Code: 960-105

£42.00



B

B

Eddy Current Unit

Two masses drop down a 33cm copper tube. One is steel, one is a neodymium magnet. When students see the magnetic mass falls more slowly than the steel mass, you can introduce them to electrical eddy currents. The currents oppose downward motion through a moving magnetic field created by the falling neodymium magnet. Includes test masses.

Code: 221-007

£19.95



C

C

Induced Current Apparatus

Consists of a primary coil of insulated copper wire wound upon a cylinder with terminals and a secondary coil wound upon a cylinder into which the primary coil fits. A soft iron core fits the cylinder of the primary. Complete with terminals.

Code: EDU095

£33.00



D

D

Force on a Conductor Apparatus

Comprising a strong U-shaped magnet and a pair of brass rails with 4mm socket terminals. A brass axle with plastic discs is free to roll along the rails and completes the electrical contact between them. When the axle is placed on the rails between the poles of the magnet, and a power supply unit is connected, the axle is repelled and rolls along the rails away from the centre of the magnetic field.

Code: EDU045

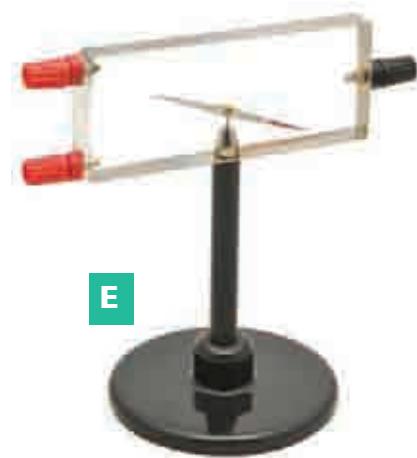
£49.00

E Oersted's Apparatus

To show the action of an electric current on a magnet. Cobalt steel needle 75mm long with agate bearing, supported by a pivot mounted on a plastic base. Needle is surrounded by a 130 x 50mm rectangular frame, in the vertical plane, fitted with two 4mm socket terminals at one end, one at the other.

Code: PH0838

£30.00



E

F Copper Voltameter

Three copper plates supplied with insulated cover and glass jar.

Code: PH0942

£18.00



F

G Conductors, 5cm dia.

Made of brass, interchangeable on pillars, fitted with insulators of ebonite on metal base.
Sphere: 5cm; Cylinder: 5cm x 12.5cm; Cone: 5cm x 15cm.

Code: PH0880 - Set of 3

£30.00



G

H Conductors, 8cm dia.

Made of brass, interchangeable on pillars, fitted with insulators of ebonite on metal base.
Sphere: 8cm; Cylinder: 8cm x 12.5cm; Cone: 8cm x 17.5cm.

Code: PH0881 - Set of 3

£40.00



H

ELECTROSTATICS

A



A

Malvern Electrostatic Kit

For a range of investigations and demonstrations of electrostatics.

Contains:

1 x electroscope; 4 x metallised polystyrene spheres; 1 x reel nylon; 1 x cellulose acetate strip; 1 x polythene strip; 1 x wire stirrup; 1 x rubbing cloth; 1 x wire hook; 1 x electrophorus on handle; 1 x proof plane; 2 x polythene tiles; 2 x aluminium cans.

Code: PH0900

£75.00



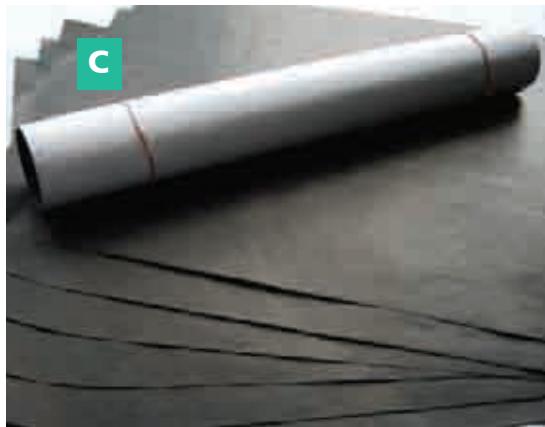
B

Electric Field Apparatus

For demonstrating electric fields between electrodes. The apparatus includes a clear Petri dish 90mm dia. x 12mm depth. The transparent base (140 x 125mm) allows the pattern to be projected via an overhead projector system. Alongside each terminal is a thumbscrew system which permits fine adjustment of the electrodes. Six electrodes are supplied, 2 'point source', 2 'line source' and 2 circular rings of 35 and 70mm dia. The apparatus requires a safe, low current limited 0-5kV EHT supply (code: 605-006).

Code: ELAP

£52.00



C

Conductive Paper

Suitable for plotting electric fields by means of the equipotential points method. Can also be used for producing home made strip resistors. Conductive paper sheet 38cm x 53cm.

Code: 231-135 - Pack of 10

£18.00

D Friction Rods

Friction Rod for various experiments involving static electricity. 300 x 12mm.

Code: FR1 - Ebonite	£1.60
Code: FR2 - Glass	£1.15
Code: P857 - Perspex	£3.95
Code: P860 - Glass/Brass	£3.95
Code: P862 - Brass/Ebonite	£3.95



E Friction Rod

For electrostatics experiments, 300mm length, 13mm diameter.

Code: PH0852 - Nylon	£2.75
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F Friction Rod Cloth

300 x 300mm square of material for producing friction with friction rods.

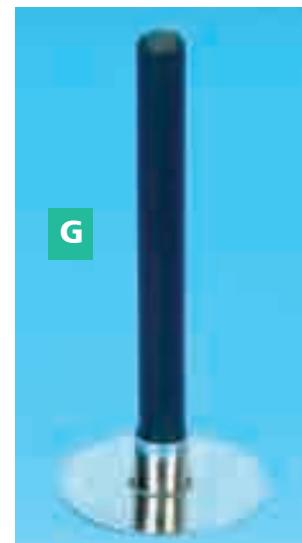
Code: P864 - Cloth	£4.15
Code: PH0868 - Silk	£4.50



G Proof Plane

Ebonite rod with 50mm diameter brass disc.

Code: PH0874	£3.50
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A

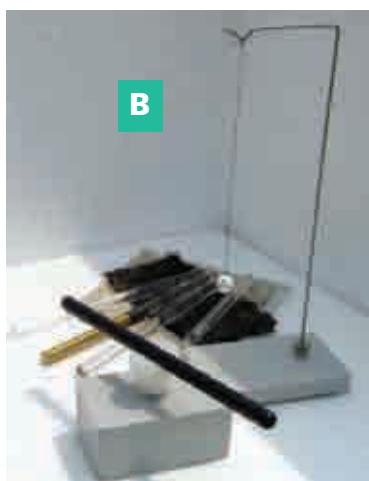
A

Electric Whirl

For demonstrating the effect of electrical discharge from points. The apparatus has a 60mm diameter three-pointed star wheel with all the points curved in one direction. The wheel rotates freely on a pivot point mounted on a short stand and the base incorporates a 4mm connection socket.

Code: P904

£12.75



B

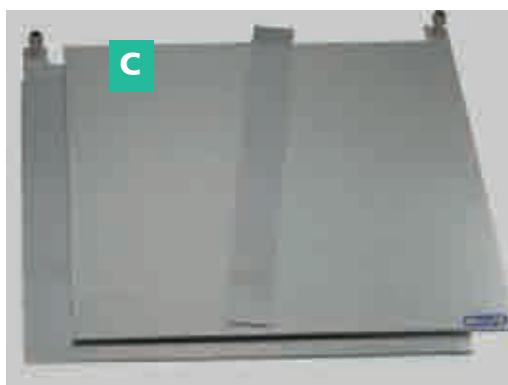
B

Electrostatic Kit with Support

This kit contains various friction rods and fabrics for electrostatic experiments. A pith ball is suspended from the support and will clearly demonstrate attraction and repulsion.

Code: 231-018

£26.00



C

C

Parallel Plate Capacitor

Comprises 2 aluminium plates of 250mm x 250mm x 2.9mm thick, with 4mm sockets. Completed with 1 acetate sheet of 260mm x 260mm x approx. 1.5mm thick and 1 acetate strip of 260mm x 25mm x approx. 1.5mm thick.

Code: 231-137

£45.00



D

D

Reed Relay

Nuffield specification 1010. A single pole changeover reed relay, capable of up to 5 to 400Hz changeovers per second driven by a Power signal generator, enables the repeated charge and discharge of parallel plate capacitors. Contact is current protected by a 12 ohm resistor. Maximum contact ratings 12V 10mA. Coil operating voltage up to 400 Hz.

Code: 231-146

£45.00

E Faraday's Pails

Set of 4 aluminium, nesting, cylindrical containers each fitted with insulating feet. 150mm dia x 120mm high; 120mm dia x 110mm high; 90mm dia x 90mm high; 75mm dia x 75mm high.

Code: PH0902 - Set of 4

£38.00



E

F Gold Leaf in Plastic Case

Gold leaves for use with electroscopes.

Code: PH0914 - Pack of 6

£9.95



F



G

G Gold Leaf Electroscope in Flask

A glass conical flask, fitted with a rubber bung supporting a brass rod with gold leaf attached. Replacement Gold Leaves (code: PH0914) available separately.

Code: PH0912

£12.75



H

H Electroscope

Rectangular cast metal case and polythene insulated lid with finger flap to facilitate removal. Fitted with a 4mm socket terminal. Front glass window slides up to allow insertion of ionising material in chamber. With gold leaf support plate and scale to show deflection. Replacement Gold Leaves (code: PH0914) available separately.

Code: PH0916A

£29.00

H

I Electroscope, Dual Purpose

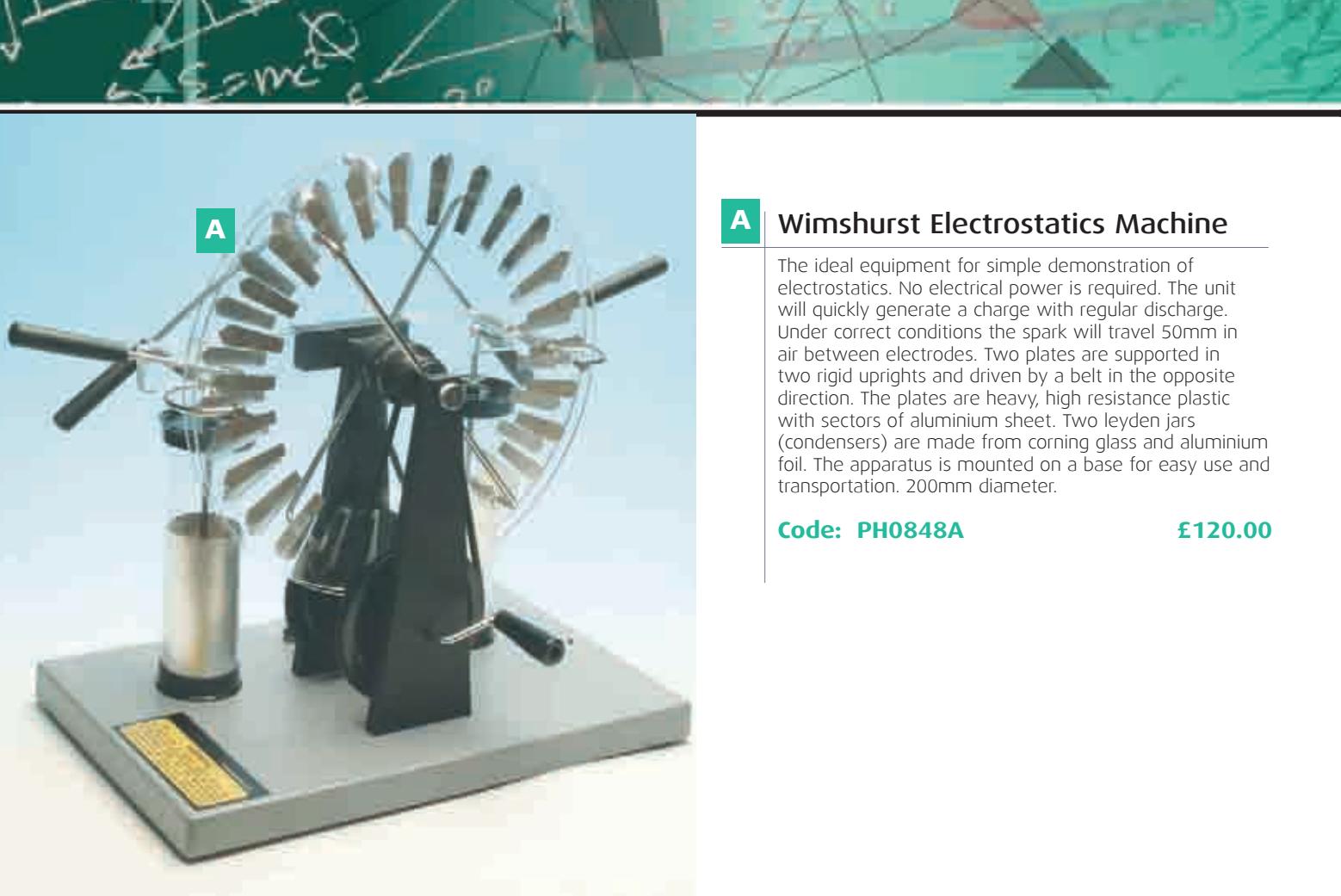
The 'Malvern' dual purpose gold leaf electroscope has a metal plate to which a single gold leaf may be attached and is supported by an insulating bush in a metal case with a 4mm socket earthing terminal. A scale is provided for measuring the deflection of the leaf. Replacement Gold Leaves (code: PH0914) available separately

Code: PH0916B

£30.00



I

**A****Wimshurst Electrostatics Machine**

The ideal equipment for simple demonstration of electrostatics. No electrical power is required. The unit will quickly generate a charge with regular discharge. Under correct conditions the spark will travel 50mm in air between electrodes. Two plates are supported in two rigid uprights and driven by a belt in the opposite direction. The plates are heavy, high resistance plastic with sectors of aluminium sheet. Two leyden jars (condensers) are made from corning glass and aluminium foil. The apparatus is mounted on a base for easy use and transportation. 200mm diameter.

Code: PH0848A**£120.00****B****Induction Coils**

This traditional induction coil is capable of producing a spark with an input of 6-12V DC and is therefore ideal for use with vacuum tubes, eudiometers etc. A fully adjustable vibrator system is incorporated with spark suppression capacitors in the base. A pair of pointer electrodes is supplied with the instrument, the pointer electrode having an insulating handle for spark gap adjustment. Low voltage input is via a pair of baseboard mounted 4mm sockets.

Code: P1170C - 20mm spark**£44.00****Code: P1168 - 30mm spark****£58.00****Code: PH1170B - 50mm spark****£115.00**

C Van de Graaff Generator

Electric or hand driven model. Powered from DC source by laboratory power supply up to 12V. This gives user control of belt speed and charge. Can also be powered by use of the supplied hand crank. 400kV. Large dome and discharge rod. Hank of hair and electric whirl included. Other accessories and parts available on request.

Code: 231-017

£195.00



C

D Van de Graaff Generator

The Generator consists of a conducting sphere (the dome) supported by a plexiglass pillar and a rubber belt driven by an electric motor concealed in the metal base. Static electrical charge is produced by friction between this band and two rollers, one of polythene, the other of plexiglass. The charge is removed from the belt by a metal gauze and stored in the dome. The electric motor is driven from the mains supply, using a three-wire cable. The base is fitted with a 4mm diameter socket which can be used either for supporting a conducting sphere (fitted with a cranked rod support) or for a wire connection to a separate conducting sphere (fitted on a plexiglass rod). A blue cover is provided to keep the Van de Graaff free from dust when not in use.

Diameter of Generator Dome: 220mm

Total Height: 500mm.

Base (max) Dimensions: 218 x 182 x 93mm

Operating Voltage: 220 to 240V AC (with 5A cartridge fuse)

Dome Capacitance: (approx) 15pF

Maximum (intermittent) current: (approx) 6µA

Maximum Spark Length: (approx) 50mm

Diameters of Conducting Spheres: 100mm

Code: VDG - Generator only

£275.00

Code: VDG/SET - with Accessory Set

£299.00

Code: VDGACC - Accessory Set

£49.00

Code: VDG/BELT - Spare belt

£11.00



D



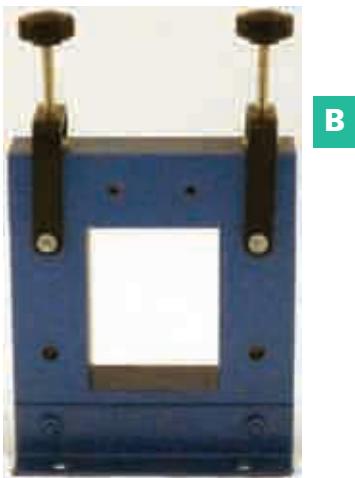
ENERGY TRANSFER

A**A****Demountable Transformer Kit**

Laminated low-loss core for attaching different coils to demonstrate the step up and step down transformer principle. Attractive demountable transformer with clearly labelled coils for GCSE physics and science and A-Level physics demonstrations. The principles used show how transformers are used in domestic electrical appliances and in the National Grid for power transmission. The core (code: PH0849/1) is made up of highly permeable U-shaped metal sheeting, which can be closed via two clamps with tightening screws. Dimensions: cross-section 40 x 40mm; 150mm (L) x 170mm (H).

Includes:

1 x 230V mains coil of 1000 turns, 1A, 13.5Ω (code: 231-028) and 1 x coil of 500 turns, 0.5A, 8.95Ω (code: 231-025).

Code: 231-021**£175.00****B****U-Core for Demountable Transformer**

U-Core from Demountable Transformer Kit (code: 231-021, 231-028).

Code: PH0849/1**£130.00****C****Coil for Demountable Transformer**

Can be used to supplement the Demountable Transformer Kit (code: 231-021) or in conjunction with the U-Core from this kit (code: PH0849/1) and any combination of the other coils (listed below). It has two front-mounted 4mm sockets and is clearly labelled.

Note: For connection to 230V mains the 1000-turn Mains Coil (code: 231-028) is required.

Code: 231-022 - 50turns, 4A, 0.15Ω **£38.00**

Code: 231-023 - 100turns, 2A, 0.55Ω **£38.00**

Code: 231-024 - 200turns, 1A, 2.5Ω **£38.00**

Code: 231-025 - 500turns, 0.5A, 8.95Ω **£38.00**

Code: 231-026 - 100turns, 0.3A, 39.5Ω **£38.00**

Code: 231-027 - 2000turns, 0.05A, 445Ω **£38.00**

Code: 231-028 - 1000turns, 1A, 13.5Ω **£69.00**
(with 230V mains connector & plug)

D Transformer Accessory Set No.1

Used to demonstrate that step down transformers can produce currents that are large enough to weld metals or boil water. Requires mains coil (code: 231-028).

Code: 231-029

£72.00



E Transformer Accessory Set No.2

Lenz's law transformer accessory to demonstrate the production of large magnetic fields and Lenz's law damping on pendulums with and without slits.

Code: 231-030

£72.00



F Demonstration Electric Motor

Simple form of DC electric motor having 2-pole armature wound with enamelled copper wire and a permanent magnetic field provided by a removable bar magnet. A disc-type commutator is incorporated and external connection to the phosphor-bronze brushes is by means of a pair of 4mm sockets. Operates on 6-8V DC.

Code: EDU727

£42.00



G Demonstration Dynamo

This Model uses the same basic assembly as the EDU727 Demonstration Electric Motor except it is mounted on a base plate (230 x 90mm) which also carries a hand-drive pulley of 120mm diameter. It is coupled to the smaller dynamo pulley by a rubber belt to give a step-up ratio. Electrical output is via a pair of 4mm sockets and a lamp is provided as a simple output indicator. The model may also be used as a motor on 6-8V DC supply.

Code: EDU728

£47.00



H Demonstration Motor AC/DC

Produces AC/DC current simultaneously when the hand wheel is turned. The generation of AC/DC Voltage is represented by LEDs.

Code: 231-032

£52.00





Malvern Energy Transfer Kit

The Malvern Energy Transfer Kit consists of a number of separately available units which enable the user to show conversions of one form of energy to another in a variety of different ways. All units have a base size of 165 x 100mm and 4mm socket terminals where appropriate.

A Malvern Motor/Generator, Large

For use as a driving unit/dynamo. Consists of a 2 to 6V DC motor provided with a 15mm diameter 'V' pulley and driving belt.

Code: PH0467A

£29.00

B Malvern Motor/Generator, Small

For use with the larger motor/generator in comparing power input and output by driving each in turn with the other and metering the voltage and current.

Code: PH0467B

£19.95

C Malvern Lamp Unit, Triple

Use with motor/generators to indicate output. Lamp holders are connected in parallel and supplied with 3 lamps (3.5V, 0.25A, MES).

Code: PH0467C

£34.00

D Malvern Fly Wheel Unit

For use with a large motor/generator and a lamp unit to demonstrate the conversion of electrical energy to kinetic energy and back again. Comprising an iron flywheel of 115mm diameter and 1.2kg mass in cast bracket with bearings. Shaft has an aluminium 44mm diameter pulley for driving. Spring belt supplied.

Code: PH0467D

£39.00

E Malvern Line Shaft Unit

For showing the conversion of electrical energy to potential energy by winding up a weight on a cord. One end of the 6mm steel shaft carries a 56mm diameter aluminium 'V' pulley and the other end is fitted with a cord anchoring collar. Supplied with a driving belt.

Code: PH0467E

£29.00

F Malvern Spring Unit

Conversion of potential energy in a wound-up spring to electrical energy. This could also be used to wind a weight on a cord showing the change from potential energy to kinetic, and back, in the raised weight. The steel shaft carries a clock spring with a free wheel device, winding ratchet and a 56mm diameter aluminium 'V' pulley. Supplied complete with driving belt.

Code: PH0467F

£42.00

G	Malvern Turbine/Pump Unit	
	Use as a water turbine to drive a generator producing electricity or as a pump driven by a motor, raising a head of water to produce potential energy. The rotor has eight bucket blades and is housed in a block turbine chamber 50 x 50 x 25mm with a clear perspex front. Two inlet (for turbine and pump) and one outlet tubules are provided. The shaft carries a 15mm dia. pulley. Driving belt is supplied.	
	Code: PH0467G	£31.50
H	Malvern Head of Water Unit	
	Use with a turbine pump unit for an open or closed system to demonstrate the conversion of electrical to kinetic energy in the pump and potential energy in the head of water. The unit is supplied complete with two 80mm diameter basins and shaped glass tubes. The upper platform has a 38mm dia hole for use as a simple recirculation system with a single reservoir.	
	Code: PH0467H	£31.50
I	Malvern Handwheel Drive Unit	
	For use in driving a dynamo, line shafts, flywheels, pumps etc. The driving and output pulleys are both 75mm dia. and the intermediate pulley 20mm diameter giving a step-up ratio of 3.75.	
	Code: PH0467I	£31.50
J	Malvern Eddy Current Unit	
	For use in conjunction with Malvern Handwheel Drive Unit (code: PH0467I) to demonstrate eddy current braking. 120mm dia. aluminium disc with a 20mm driving pulley.	
	Code: PH0467J	£31.50
K	Malvern Mounted Motor for Solar Cell	
	Small low consumption electric motor designed to run directly from the output of the solar cell, to illustrate the direct conversion of light energy to electrical and hence mechanical. The motor spindle carries a simple 16mm diameter pulley and is capable of raising a mass of at least 4g powered by the solar cell.	
	Code: PH0467K	£15.00
L	Malvern Mounted Solar Cell	
	For use with the motor to demonstrate the production of electrical energy directly from light energy. The apparatus comprises a selenium photo-voltaic cell.	
	Code: PH0467L	£37.00
M	Malvern Energy Transfer Lamp	
	For use in conjunction with the Malvern Mounted Solar Cell (code: PH0467L) and Malvern Mounted Motor for Solar Cell (code: PH0467K). Consists of a 12V, 24W S.B.C. bulb in a metal socket, mounted on a base with two 4mm sockets.	
	Code: PH0467M	£18.00





A Bicycle Dynamo

For demonstrating the use of a dynamo in lighting a lamp. This apparatus has a cycle dynamo mounted on a base connected with an MES lamp holder and 2.5V bulb. 220 x 115 x 105mm (H).

Code: BDYNAM

£59.00



B Hero's Engine

This is a model of a steam engine invented by Hero of Alexandria in about 60 AD. It represents an early example of a machine that will transform thermal energy into kinetic energy. Hero's engine illustrates transformations of energy and aspects of Newton's laws of motion. The engine operates similarly to a rocket engine. The thermal energy supplied by the bunsen burner (not supplied) is transformed into kinetic energy in the steam jets. These jets possess momentum, and by Newton's third law ('action and reaction are equal and opposite'), give backward momentum and hence backward force to the nozzles from which they emerge. These forces create a turning movement about the longitudinal axis of the glassware and hence the glass apparatus rotates.

Code: P498

£29.00



C Solar Furnace

To illustrate the transfer of energy by solar radiation. Demonstrate with this 30cm diameter parabolic reflector. It concentrates sunlight on a black-coloured copper cup.

Code: 211-012

£59.00

D Diesel Engine - two stroke

A model of a two-stroke diesel engine made in aluminium alloy and gunmetal. Ignition is shown by means of a 1A bulb. Fuel supply is also sectioned. Mounted on base with hand crank provided for manual operation.

Code: PH0490

£89.00



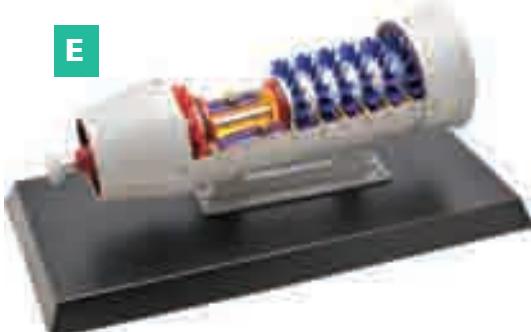
D

E Gas Turbine/Turbo Jet Engine

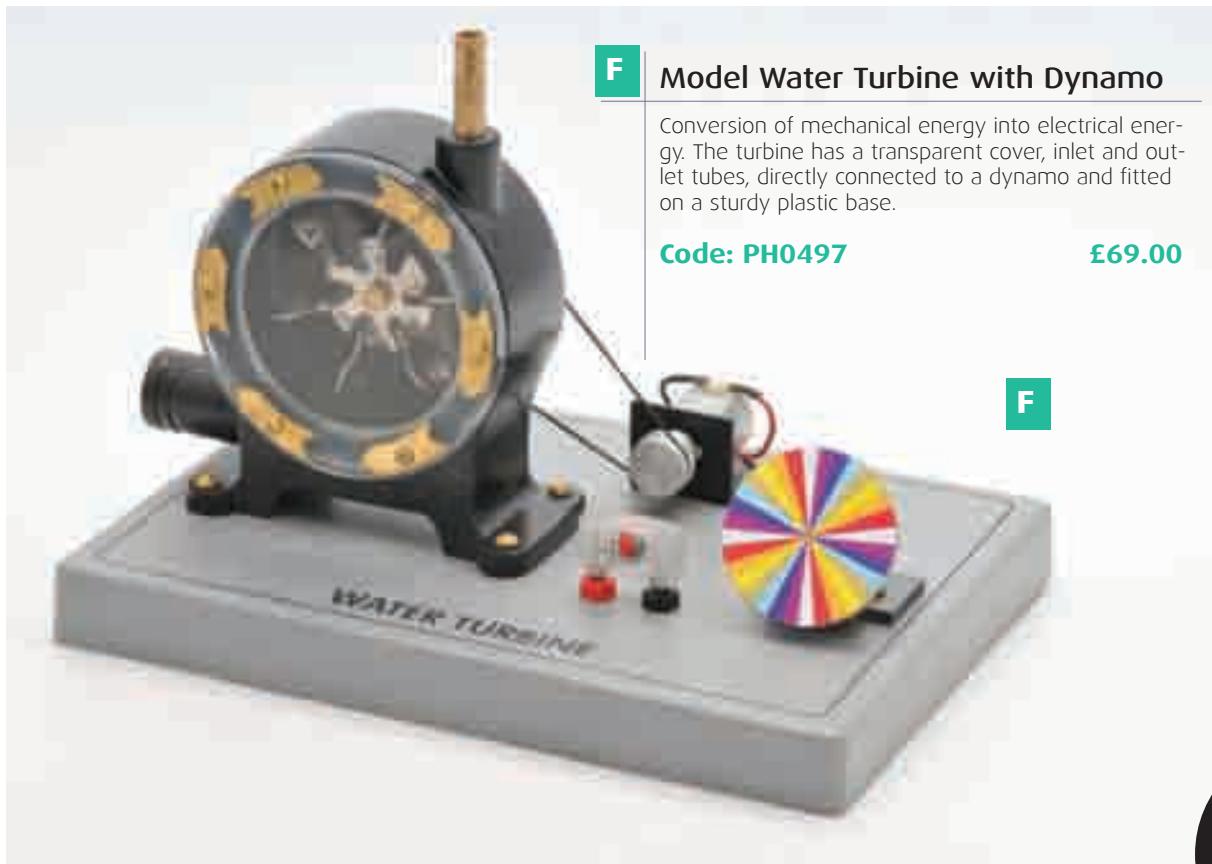
This cutaway section model is constructed of light and strong metal and mounted on base. It shows air intake, axial flow, double stage compressor, fuel supply, combustion chamber, turbine rotor, jet thrust, exhaust etc.

Code: PH0494

£195.00



E



F Model Water Turbine with Dynamo

Conversion of mechanical energy into electrical energy. The turbine has a transparent cover, inlet and outlet tubes, directly connected to a dynamo and fitted on a sturdy plastic base.

Code: PH0497

£69.00

F

DENSITY



A Materials Kit

A selection of materials in the form of rectangular blocks intended to familiarise the student with appearance, feel, texture, hardness and density of a range of common substances. The set consists of 2 each of seventeen blocks:

50 x 40 x 30mm: softwood, hardwood, paraffin wax, aluminium, iron & foam polystyrene; 20 x 20 x 100mm: perspex, glass, slate, aluminium, softwood, marble; 50 x 50 x 20mm: lead; 50 x 50 x 80mm: aluminium; 50 x 50 x 200mm: hardwood; 20 x 20 x 50mm: brass; 40 x 40 x 20mm: iron.

Code: MATKIT £105.00

Code: MATKIT6 £10.00
Aluminium Block, 50 x 50 x 80mm

Code: MATKIT7 - Pack of 4 £10.00
Iron Block, 40 x 40 x 20mm

Code: MATKIT8 - Pack of 8 £8.00
Softwood Block, 20 x 20 x 100mm

Code: MATKIT9 - Pack of 8 £10.00
Paraffin Wax Block, 50 x 40 x 30mm

Code: MATKIT10 - Pack of 24 £24.00
Polystyrene Block, 50 x 40 x 30mm

Code: MATKIT11 - Pack of 4 £19.00
Iron Block, 20 x 20 x 100mm

Code: MATKIT12 - Pack of 8 £14.00
Slate Block, 20 x 20 x 100mm

Code: MATKIT13 - Pack of 8 £10.00
Hardwood Block, 50 x 40 x 30mm

Code: MATKIT14 - Pack of 8 £10.00
Softwood Block, 50 x 40 x 30mm

Code: MATKIT15 - Pack of 4 £19.00
Aluminium Block, 50 x 40 x 30mm

Code: MATKIT16 - Pack of 8 £12.00
Perspex Block, 20 x 20 x 100mm

B Spares for Materials Kit

Code: MATKIT1 £5.00
Glass Block, 20 x 20 x 100mm

Code: MATKIT2 - Pack of 4 £24.00
Lead Block, 50 x 50 x 20mm

Code: MATKIT3 - Pack of 4 £9.50
Marble Block, 20 x 20 x 100mm

Code: MATKIT4 - Pack of 4 £19.00
Brass Block, 20 x 20 x 50mm

Code: MATKIT5 - Pack of 4 £15.00
Aluminium Block, 20 x 20 x 100mm

C Metal Cylinders

Precision cylinders for experiments on density. Set of 6 10mm dia. cylinders: Brass, Lead, Iron, Copper, Aluminium and Zinc. Supplied in wooden block.

Code: P110A - Set of 6, 30mm £15.00
Code: P110B - Set of 6, 40mm £17.00



D Density Kit

Various shapes are used to teach students how to make measurements in the Metric System and how to use the formula: Density = Mass/Volume. Students use the various materials to demonstrate densities. Includes one aluminium bar, 3" x 1" x 0.25", two 0.5" aluminium cubes, one steel sphere, one glass sphere, and one dual-graduated scale, with 0-15 centimetres on one side and 0-6 inches on the other.

Code: 3131 £16.00
Code: 3132 - Pack of 10 £110.00



E Density Cubes

Code: CBM10 - Set of 7, 10mm £12.00
 Brass, Lead, Steel, Copper, Aluminium, Iron & Tin.
Code: EDU892 - Set of 6, 20mm £12.50
 Brass, Lead, Zinc, Copper, Aluminium & Iron.
Code: CBM20 - Set of 7, 20mm £17.00
 Brass, Lead, Steel, Copper, Aluminium, Iron & Tin.
Code: EDU605 - Set of 5, 20mm, Aluminium £6.50
Code: EDU606 - Set of 5, 20mm, Brass £9.00
Code: EDU607 - Set of 5, 20mm, Copper £12.00
Code: EDU608 - Set of 5, 20mm, Steel £9.00
Code: EDU609 - Set of 5, 20mm, Lead £12.00
Code: EDU752 - Set of 5, 20mm, Plastic £5.25
Code: EDU610 - Set of 5, 20mm, Wood £3.75
Code: EDU611 - Set of 5, 20mm, Zinc £12.75
Code: EDU612 - Set of 5, 20mm, Stone £9.00
Code: EDU663A - Set of 12, 20mm £31.50
 Hardwood, Softwood, Brass, Tin, Zinc, Copper, Aluminium, Iron, Marble, Granite, Lead, Perspex.



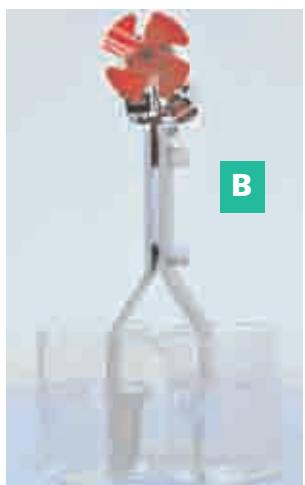
E A typical selection of products



HEAT



A



B



C



D

A

Heat Poster, 890 x 584mm

A graphic depiction of key heat concepts. Includes an illustrated view of the sources of heat; the transfer of heat energy; heat absorption; the expansion and contraction of matter; and much more.

Code: 44-35-1111

£29.00

B

Thermoelectric Converter

A series of semiconducting junction plates is sandwiched between 2 aluminium heat-conducting plates. When a temperature difference exists between the 2 sides of the junction plate, electric current is generated to drive a little fan, providing a visual demonstration of the current produced. There is a switch on the thermoconverter to switch the junction plates between the motor fan or a pair of 4mm sockets. When the 4mm sockets pair are selected and driven with a 5V DC voltage, a temperature difference will be created and conducted by the aluminium plates.

Code: 211-008

£42.00

C

Conducting Putty

Conducting putty is a useful aid to teaching resistivity and the relationship between length and cross-sectional area on resistance. A cylinder 60mm long and 20mm in diameter has a resistance of approximately 20W. Can readily be connected into an electrical circuit and both length and diameter can easily be altered by 're-moulding' the putty. Approx. 100g.

Code: 251-415

£10.25

D

Heat Sensitive Paper

A novel way to investigate temperature, insulation, and body temperature. Heat sensitive thermochromic paper changes colour as the temperature rises, even from the heat of your hand. The paper is supplied in four colours - blue/white, purple/pink, pink/white and green/yellow. Pack of 40 A4 sheets.

Code: 211-013

£19.95

E Ball & Ring Apparatus

Two piece apparatus for demonstrating thermal expansion.

Code: BRNG

£5.00



F Bar & Gauge Apparatus

For illustrating expansion by heating and contraction by cooling. Comprising a bar of iron mounted on a support rod with wooden handle, and a brass gauge with a cut-out which barely admits the bar lengthways while cold, and a hole which passes the bar endways only while cold. Heating the bar and then comparing it to the gauge provides an excellent visual demonstration of thermal expansion.

Code: P378

£7.30



G Bimetallic Strip

For demonstrating the differential expansion of two metals by the curvature produced when the strip is heated in a flame. Comprises a 200 x 15mm strip of brass and steel riveted together with heat resistant rivets and mounted in a well-finished wooden handle.

Code: BIMET

£6.25

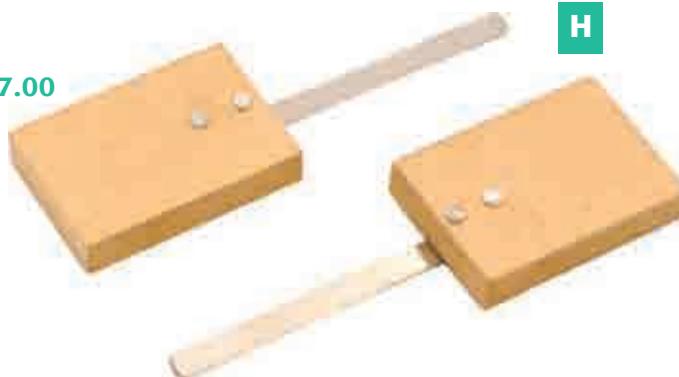


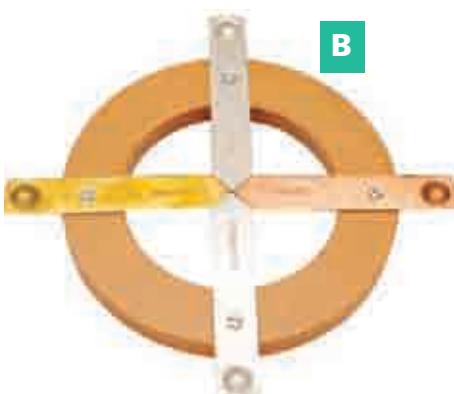
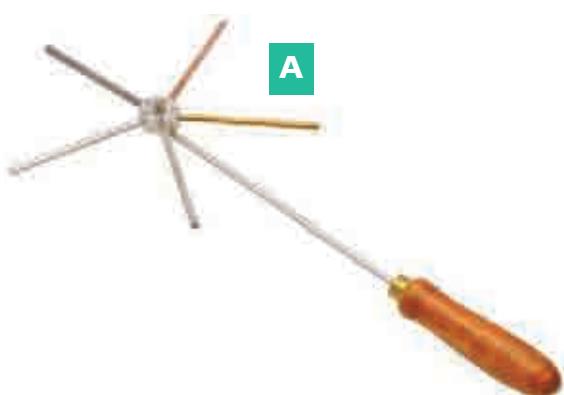
H Bimetallic Strips

With this kit students can easily investigate and utilise the effect of temperature change on a bi-metallic strip. The kit consists of a class set of 10 bi-metallic strips, measuring 100 x 8 x 0.5 mm, securely attached to wooden supports. The device can be held in a standard laboratory clamp. With a few leads, a battery or power supply, a buzzer and some crocodile clips students can invent a fire alarm while revising simple circuit work. The apparatus can form the basis of many other design projects such as thermostats or investigations into expansion.

Code: PH0382 - Pack of 10

£37.00





A Conductometer

To demonstrate relative thermal conductivity of brass, copper, nickel, aluminium and iron. A rod of each metal is radially spaced equally on a brass hub. Each of the rods has a cavity at the outer end for holding paraffin wax. Using the wooden handle, hold the brass hub over a flame and see the wax melt at different rates.

Code: PH0377

£23.00

B Conductivity of Metal Apparatus

Strips of copper, brass, steel and aluminium mounted on a wooden ring and meeting in the centre. Gentle heating at the centre melts wax placed in the hollows at the end of each strip. Rates of conductivity in the different metals can be compared by the difference in time taken for each cup of wax to melt.

Code: EDU083

£7.30

C Conductivity Rods

Rods are 300mm long x 3mm diameter. Used for thermal conductivity experiments.

Code: CONCU - Copper, Pack of 3 **£4.00**

Code: CONFE - Iron, Pack of 3 **£4.00**

Code: CONRD - Aluminium, Pack of 3 **£4.50**

Code: PH0397 - Combination, Pack of 3 **£5.00**

Iron, Copper and Aluminium

Code: PH0397G - Combination, Pack of 6 **£8.95**
Brass, Copper, Iron, Lead, Zinc and Aluminium

D Ingenhausz Conductivity Apparatus

Five rods, one each of aluminium, brass, copper, zinc and iron, embedded along one side of a metal tank, size 150 x 90 x 100mm. Rates of melting compared by placing wax on the ends of the different rods thus demonstrates rates of conductivity in the different metals.

Code: EDU174

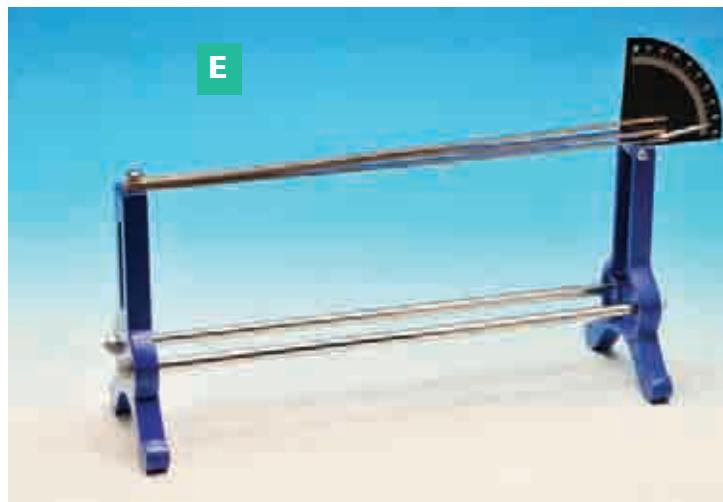
£35.00

E Linear Expansion Apparatus with Scale Reading

Two black metal pillars on a grey metal base, both drilled to hold metal specimens in the form of thin rods. Three rods of different metals are provided with thinner versions of two of these. An engraved scale with a sprung metal pointer is attached to one of the pillars to record the thermal expansion of the rods. Heating can be either by a spirit lamp or Bunsen burner. The spirit lamp has the advantage that it can be placed under each rod and left there. The Bunsen burner has to be hand-held but gives greater heating. The effective length of the rod when mounted between the pillars is 210mm. The pointer has a velocity ratio of 2.5. Moderate heating is sufficient to show that metals expand when heated and that different metals expand by different amounts. The apparatus, whilst clearly showing qualitative comparisons, is not intended to give accurate quantitative results.

Code: PH0368

£55.00



E

F Wood and Metal Cylinder

Comprising a cylindrical rod composed of two halves, one end of which is metal, the other wood. If paper is wrapped tightly round the cylinder and the rod is briefly held above a Bunsen flame, the portion in contact with the wood will be quickly scorched while the portion in contact with the metal will remain uncharred. 200 x 30mm (dia.)

Code: PH0405

£9.75



F

G Bursting Bottles

Designed to demonstrate the expansion of water on freezing. Comprises cast-iron bottle, 90 x 20mm, tapped to take threaded, square-shanked iron stopper.

Code: EDU1035 - with Stopper **£7.50**

Code: EDU1035A - without Stopper **£5.50**



G

H Leslie Cube

Tinplate box with 100mm sides. The top opening is of 75mm diameter and is fitted with a lid. The apparatus is filled with water maintained at boiling point by a low bunsen flame. Infra-red sensors may be used to compare the relative radiant heat output from each of the four faces which are, respectively, blackened, roughened, varnished and polished.

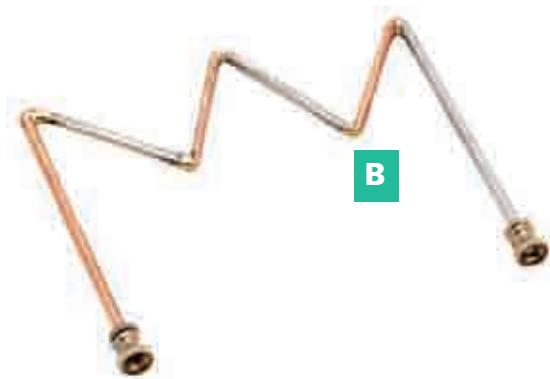
Code: P411

£25.00



H

Heat



A Hope's Apparatus

Designed to show that water has a maximum density at 4°C. In winter, ponds and lakes are cooled from above. Convection then occurs throughout until a dense layer of water at 4°C forms on the bottom. The water above continues to cool until it freezes, then the ice provides an insulating layer that keeps the denser water beneath from cooling as quickly. The comparatively warm layer on the bottom enables aquatic life to survive. Were water not to have its maximum density at a temperature above its freezing point, then ponds and lakes would freeze throughout and, because heat conduction between air and ice is such a slow process, possibly fail to thaw even during the summer months.

Code: P388

£17.00

B Thermopile

Four 130mm long copper and iron wires twisted together to form seven junctions, four on one side and three on the other. Fitted with brass connectors.

Code: PH0428

£6.00

C Crookes' Radiometer

Comprising partly evacuated glass bulb approx 70mm diameter, with contained at its centre a fine pivot which supports four lightweight metal arms. One side of each vane is blackened, the reverse side is white. Infrared radiation heats the black faces of the vanes more than the white, causing a pressure difference on either side of the vanes which drives the vanes round, providing a pleasant visual demonstration of several physical effects. Discussion of the mechanism turning the vanes covers several areas of physics including: thermal radiation and absorption; thermal transfer; air pressure; and momentum of gas molecules. Mounted on a round plastic base.

Code: EDU094

£11.50

D Convection in Air Apparatus

Consists of a metal box 220 x 100 x 165mm, with a sliding glass front and two detachable glass chimneys. A candle holder is fixed to the base beneath the left chimney. Candles not included.

Code: P410

£23.00

E Convection in Water Apparatus

Comprising rectangle of 20mm borosilicate glass tubing fitted with a filling funnel to show convection in liquid. Supplied as tube only without clamps.

Code: PH0408B

£23.50



F Boyle's Law Apparatus

Apparatus for the recording of pressure versus volumes and for investigating Boyle's Law. The vertical tube is part-filled with the coloured liquid and sealed. The trapped air is then compressed progressively, with pressure (p) and volume (v) readings taken at each stage. Before each pair of readings is taken, the liquid should be allowed to settle so that the heat caused by the compression is dissipated. Oil included.

Code: EDU721

£125.00



G Boyle's Law Apparatus

This apparatus provides an excellent method of demonstrating Boyles Law. The unit is mounted on a sturdy Perspex board. The gauge and syringe are connected by a high pressure hose.

Code: 251-401

£84.00



H Boyle's Law Apparatus, Simple Type

A simple and economical apparatus for the demonstration of Boyle's Law. Consists of a sealed syringe mounted on wooden platforms. When loaded with different masses the air inside is compressed. Change in volume can be read from the syringe scale.

Code: 251-403

£10.50



**A****Bourdon Gauge**

This product is for both general and laboratory use. The gauge of rugged design is mounted on a heavy metal base giving great stability. The read-out is by a substantial black needle on a 100mm diameter white face. The back of the gauge is enclosed by clear Perspex, allowing the mechanism to be viewed. The input metal tube is rifled and designed to fit rubber tubing of 8mm internal diameter.

Calibration: Scales are given on the white face in both kg/cm² (black) and psi (red). Conversion to SI units (pascals) can be obtained with sufficient accuracy by multiplying the kg/cm² readings by 105.

Note: The gauge is for positive pressures only (i.e. those in excess of atmospheric pressure). Connection to a source of negative pressure (e.g. vacuum pump) could result in damage to the apparatus.

Code: BC-2004**£59.00****B****Jolly's Bulb and Gauge**

Comprising a thin-walled spherical bulb connected to a mechanical pressure gauge. The gauge gives instant pressure readings and reduces the inconvenience when using a manometer.

Code: EDU079**£47.00****C****Immersion Heater**

A sheathed miniature heater specially designed for use with metal block calorimeters. Electrical connection is via 300mm leads with heat resisting insulation and 4mm terminals. 12V, 50W.

Code: PH0436**£24.00**

D Calorimeter Heating Block

For the experimental determination of the specific heat capacity of different metals. Cylindrical metal blocks, mass 1kg adjusted to an accuracy of $\pm 2\%$. Each block is drilled with two holes, a large central hole 12.5mm diameter for a special immersion heater and a smaller hole of 7.5mm diameter for a thermometer or temperature sensor.

Code: CABLAL - Aluminium, 100 x 70mm	£17.50
Code: CABLBR - Brass, 108 x 40mm	£24.50
Code: CABLCU - Copper, 102 x 40mm	£28.00
Code: CABLST - Steel, 115 x 40mm	£12.00



D

E Copper Calorimeter for Combostill

A copper calorimeter specially made to fit the Combostill (code: 310-009), enabling physics experiments to be performed on a microscale.

Code: 310-001	£8.00
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E



F Copper Calorimeters

With parallel sides and rolled rim, without stirrer.

Code: PH0438A - 75 x 50mm dia.	£5.60
Code: 211-007 - 100 x 65mm dia.	£7.50
Code: PH0438B - 100 x 75mm dia.	£7.85

F

G



G Aluminium Calorimeters

With parallel sides and rolled rim, without stirrer.

Code: PH0440A - 75 x 50mm dia.	£4.95
Code: PH0440B - 100 x 75mm dia.	£6.95

H Calorimeter, Polished Copper

Resting on a felt pad inside an outer vessel 100 x 75mm (diameter). The outer vessel is fitted with a detachable clip-type thermometer support. Complete with stirrer.

Code: PH0444	£23.00
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H





A Joules Calorimeter, Copper

For the determination of the specific heat capacity of a liquid by the electrical method. The unit is a nickel-plated copper calorimeter 75 x 50mm (diameter), lagged and enclosed within an outer vessel 100 x 75mm (diameter). A close-fitting ebonite lid is provided with a wire stirrer, and a pair of 4mm socket terminals connected to a Constantan wire heating coil. The resistance of the coil is approx. 6ohm and should be used with a current 0.5A (with a maximum of 1A). Supplied without thermometer.

Code: PH0452A

£42.00



B Calorimeter Set, Aluminium

Comprising:

Outer vessel 125 x 145mm; Inner vessel 100 x 125mm; Fibre insulator; Stirrer; Rubber stopper; Transparent cover; Thermometer. Capacity: 1 litre. Weight: 700g.

Code: 211-002

£52.00



C Calorimeter Set

Joule's Calorimeter Set:

Precision heating element.

Custom made foam plastic heat insulation.

Spare cap included for when an experiment does not require heat.

Stirrer and stopper included.

No thermometer included.

Outer vessel plastic 110 x 100mm.

Inner vessel aluminium 70 x 65mm.

Precision heater is 12W.

It is a 1% resistance tolerance 2W resistor conveniently mounted on nickel plated brass poles by means of a transverse screw.

Code: 211-010

£52.00

D Steam Generator with Handle

Steam generator constructed from copper. 280 x 115mm, capacity 1.5L. Neck is 23mm in diameter. With side tube and water gauge.

Code: PH0458

£16.00



D

E Thermistor System

This apparatus contains an NTC based thermistor, with a nominal resistance of 4.7kohm, in a glass tube with electrical connection made by means of 4mm sockets. Students from Key Stage 3 to Post-16 can carry out practical investigations into the thermistor characteristics. Rod length: 220mm.

Code: 270-131

£25.00



E

F Heat Absorption & Radiation Comparator

The apparatus allows demonstration for comparing heat absorption & radiation between dull and black bodies. Comprises a 12 V bulb which acts as a heat source and 2 parabolic metal bodies, one finished in black and one in shiny metal. These bodies have 2 thermometer holders attached for temperature readings.

Instructions included.

Thermometers not included.

Code: 211-011

£29.00



F

Heat

FORCE, MOTION, DYNAMICS



A

Force and Motion Poster
890 x 584mm

Graphically depicts force measurements; gravity and motion; Newton's Laws and much more!

Code: 44-35-1106

£29.00



B

Magdeburg Hemispheres, Brass

To demonstrate the existence of atmospheric pressure.
Made of brass and fitted with stopcock and handle.
Diameter: 75mm.

Code: MAGD

£39.00



C

Magdeburg Hemispheres, Plastic

Plastic model with wooden handles.

Code: 201-002

£30.00

D Fire Syringe

Designed to provide a safe but very dramatic demonstration of the generation of heat by gas under compression. The piston inside a heavy-walled combustion tube is housed inside a transparent plastic outer cylinder to provide an unobstructed view of the action inside the tube. Cotton at the bottom of the tube ignites in a flash as the plunger rapidly compresses the gas inside the tube.

Code: 3572

£40.00



E Smoke Cell

For the observation of 'Brownian Motion' in smoke particles. Consisting of a box with plastic lid as well as flanges that allow easy attachment to standard microscopes. The box contains a smoke cell, cylindrical condensing lens and a 12V, 3W festoon bulb. The apparatus has been preset to focus the light at correct height. The set is supplied complete with detailed instructions and a squeeze-bottle type smoke generator. Dimensions: 90 x 46 x 20mm.

Code: WBSM

£19.95



F Static Cell

A self contained, sealed, acrylic enclosure measuring 180 x 180 x 40mm containing polystyrene spheres. When the top surface is lightly rubbed with a cloth, the static charge developed causes the spheres to jump around inside the unit. A convenient and dramatic demonstration of charged particle attraction and repulsion.

Code: 10-850

£30.00



G Kinetic Theory Model

Large demonstration model. Polystyrene balls included. 6V DC. **Note: Power supply shown is not included.**

Code: 201-001

£69.00




A

B

C

D

A Gyroscope with Stand

For showing the effect of precession. The brass wheel is 7.5cm in diameter, 3cm at its rim. Carefully balanced and all three pairs of pivots are adjustable. Complete with stand.

Code: PH0342

£55.00

B Gyroscope

Simple but accurate gyroscope that will run for more than five minutes once set in motion.

Code: 251-003

£22.00

C Newton's Cradle

A quality wood-framed Newton's Cradle, used to demonstrate conservation of momentum and energy. Five steel balls on extra strong adjustable string.

Code: 251-002

£45.00

D Crushing Can

A light-walled tin plate can with an air-tight screw cap. Used to demonstrate force exerted by atmospheric pressure. 260 x 75mm (diameter).

Code: 211-401

£2.75

E Force Table

With a large, 40cm diameter tabletop, 3cm thick support column and heavy cast base with levelling screws, this force table is suitable for use in any basic physics lab. The durable polymer tabletop carries an angle scale with 0.5° divisions, marked every 10° in both rotation directions. Four tableclamp pulleys are included, each has a circular cut-out with a fiducial mark for accurate angle measurements. Four sets of slotted masses, each 150g x 5g including hangers, are supplied with the table. The slotted masses have a keyhole pattern which secures them during adjustments. The cords include split rings for easy connection, allowing three-force and four-force equilibrium arrangements to be rapidly constructed. Includes spirit level. The table is 41cm high.

Code: 251-404

£165.00



F Force Board, 750 x 600mm

For demonstrating the principles of the parallelogram and polygon of forces. Fitted with metal brackets for fixing to a wall. Designed so a clear space is left all round the edge of the board for the attachment of pulleys etc. The board is supplied complete with mounting brackets, cords, pulleys and masses.

Code: P348

£58.00



G Torsion Study Apparatus

Device designed for the study of torsion of couples and torsion pendulum. The apparatus consists of a plate with central hole equipped with two pulleys with ball bearing. Lines traced on plate give the direction of action lines.

Includes:

A dented lever with central core allows hanging torsion line.

A hanger bracket holding a graduated drum on which axis the torsion line is fixed.

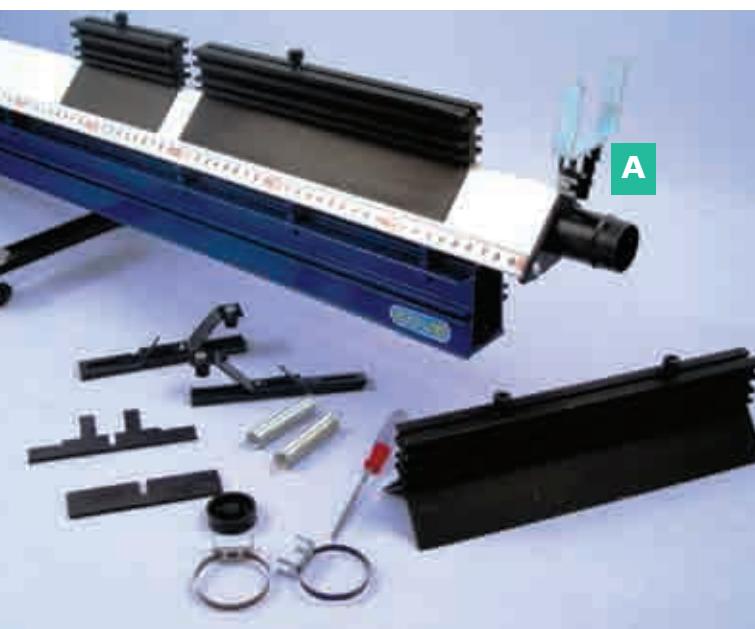
A set of 7 torsion lines with tips.

Eight round weights of 10 g each and two hangers to apply forces to lever are provided.

Code: 251-411

£175.00





Linear Air Track with Accessories

This kit is designed to provide a cost-effective system for the study of all aspects of dynamics in a virtually friction-free environment. It is particularly effective in the field of collisions where conservation of momentum is dramatically demonstrated. The kit contains everything required for a vast array of experiments covering: velocity; force and acceleration; potential energy; kinetic energy; conservation of energy; SHM; motion on level and inclined planes etc.

The track itself measures 2 metres overall and is made from strong 56 x 56mm extruded aluminium. Gliders are designed to accept standard slotted masses for additional loads. It is supplied with a comprehensive accessory pack to facilitate every type of interaction.

Overall dimensions: 2055 x 224 x 180mm.

Total weight: 9kg.

Glider lengths: 120mm, 240mm.

Recommended operating temperature: 10 to 40°C.

Recommended operating humidity: <85%.



A

Linear Air Track without Blower

Supplied with a range of accessories including vehicles with mass attachments, catapults and buffers. For measurement of glider speeds, standard light gates and timers are required. An air source is required to operate the track, which can be provided by a vacuum cleaner or our Laboratory Air Blower (code: LINBLO) which is not included.

Code: LINTRC

£395.00

B

Linear Air Track with Blower

A complete package for air track experiments. Includes the Edulab linear air track, accessories and air blower.

Code: LINSET

£525.00

C

Linear Air Blower

This electronically controlled unit is specifically designed for laboratory use and is recommended for use with our Linear Air Track. A constant volume and pressure can be delivered to the apparatus enabling accurate results to be obtained. It has a flexible hose for connection to the Linear Air Track (Code: LINTRC).

Motor: 220-240V 50Hz, 700W.

Code: LINBLO

£199.00

D Projectile Launcher

Constructed from white foam PVC, 35 x 35cm, with a detachable foot and vertical height scale in cm. A detachable support can be used when required to hold a second ball for two dimensional collision studies. Suitable for marbles or ball bearings 10 - 20mm diameter (2 x 12mm steel balls included).

Code: 30-750

£79.00



D

E Vacuum Bazooka

This amazing device attaches to a vacuum cleaner and launches lightweight, hollow projectiles at high velocity. When aimed vertically typical heights reached are 5 to 6 metres. Additional weights can be added to the projectiles for all manner of investigations into energy, acceleration, momentum etc. An essential item to brighten up the subject of dynamics or to amaze everyone on open days and science fairs. As featured in the book 'Vacuum Bazookas and Electric Rainbow Jelly' by Neil Downie. Overall dimensions 520 x 120 x 100mm. Vacuum cleaner required to operate (not supplied).

Code: 30-800

£59.00



E

F Pressure Toadstools

Set of clear, square-section acrylic rods ranging from 6 to 15mm thick. Each rod is 100mm long with a securely fastened top platform to support applied loads and the square section design makes area calculations simple. Unlike wooden dowels the acrylic does not absorb water and is far more durable. Supplied in a vacuum-formed tray, which can be used to hold the moist sand during the investigation.

Code: 60-180 - Set of 5

£58.00



F

G Braking Car

A lightweight, three-wheeled dynamics vehicle measuring 150 x 80 x 70mm with a central plunger. This can be released by a simple mechanical trigger at a predetermined point on a track. The plunger provides a braking force due to friction which can be varied by adding standard slotted weights.

Code: 260-701

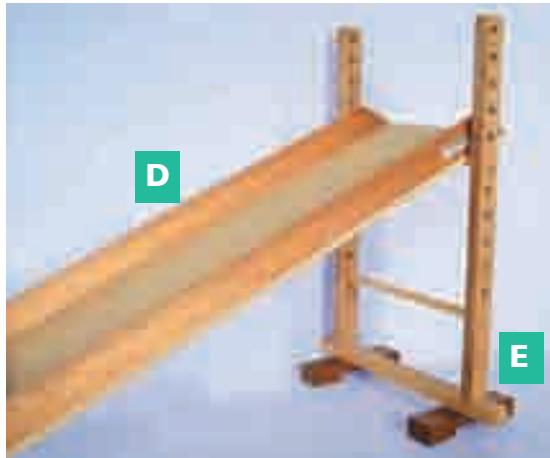
£44.00



G


A

B

C

D
E

F
A

Hill and Dale

This apparatus easily unfolds to provide the 0.5m linked tracks with pulley for the 'diluted gravity' investigation. Supplied with two freely running model cars attached to a thread with provision for adding extra slotted masses. Wooden block height adjusters included. Overall dimensions 120 x 50 x 1000mm (extended). 50cm long in the folded form.

Code: 60-170

£95.00

B

Dynamics Trolleys, Wooden

A pair of 300mm long wooden trolleys, mounted on three wheels. A spring loaded rod is fitted to give impulse when released. It has a provision for stacking the trolleys on top of each other and fixing with removable pins.

Code: EDU041

£49.00

C

Dynamics Trolleys, Plastic

Made from rigid ABS plastic, this pair of trolleys have accurately-aligned, very low friction wheels. Coupled with their low profile and accurate mass of 600g, this allows a range of kinematic experiments to yield high quality data. The two-position firing pins have a locking catch for safety and the trolleys have velcro pads for inelastic collision experiments. The trolleys are stackable and can withstand loads up to 60kg. Dimensions: 310mm (L) x 130mm (W) x 90mm (H).

Code: 251-400

£57.75

D

Dynamics Track

The track bases are in thick MDF with hardwood side supports which give good resistance to flexing. Rounded corners avoid injuries. Support bar feet link with the support frame which provides a robust system for height adjustment. Support frame (code: 970-117) available separately.

Code: 970-114

£48.00

E

Dynamics Track Support Frame

Sturdy hardwood construction with adjustable cross support allows students to change the slope angle in a simple and effective way.

Code: 970-117

£48.00

F

Dynamics Track Run-off Ramp

The run-off ramp can be used with the Dynamics Track (970-114) and bridges the gap between track and floor when required.

Code: 970-118

£23.00

G Force, Motion & Dynamics Kit

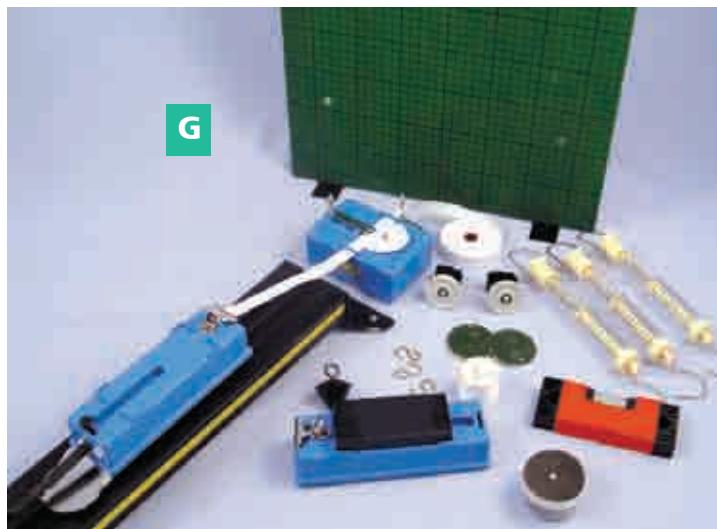
This apparatus comprises a high quality aluminium profile bench with a built in scale to make a variety of measurements. The system provides a highly motivational approach to conducting dynamics experiments. Investigate the effect of different accelerating forces on different masses, elastic and inelastic collisions between two trolleys, acceleration on an inclined plane, kinetic energy and many more.

Contents:

- 1 x Aluminium Profiled Bench, 1.2m rigid construction
- 1 x Spring Loaded Trolley, 740g low friction trolley
- 1 x Standard Trolley, 740g low friction trolley
- 1 x Trolley Weight (brick), 500g for additional mass
- 10 x 10g Masses, with securing hole
- 1 x Ticker Tape Timer, 6V AC operation
- 100 x Carbon discs, for ticker tape timer
- 5 x Ticker Tape Rolls, 30m length
- 1 x Line Level, for setting up bench
- 1 x Force Board, with legs for bench mounting
- 2 x Pulleys, with integral clamp for force board
- 1 x Reel of Cotton, accessory for force board
- 3 x Hooks, accessory for force board
- 1 x Pendulum Bob, accessory for force board
- 3 x Spring Balances, 10N/1kg, Beige

Code: EDU801B

£225.00



H Dynamics System

Consisting of one pair of wooden trolleys. A 1500mm x 300mm wooden track with side rails is included. Plastic feet are mounted on the track to provide an easily inclinable surface for dynamics experiments

Code: EDU887

£179.00



I Track & Accessories

Designed to suit curriculum based experiments for the topics of Force & Motion. The carefully designed and matched components provide an excellent medium for demonstrating these important principles. The unit comprises: Aluminium Track, 1.2m; 2 high-impact moulded trolleys (1 spring loaded); 1 trolley weight; 10 x 10g masses; 1 x ticker tape timer; 20 x carbon discs.

Code: EDU043

£175.00




A

Capacitance Substitution Box

This unit has an easily selectable range of 11 preferred capacitors from $100\mu\text{F}$ to $0.47\mu\text{F}$. The voltage rating for each range is 50 volts AC or DC. The unit is housed in a robust ABS case measuring 75 x 100 x 40mm and has a high quality rotary selector switch plus two 4mm safety sockets.

Code: EDU082

£21.00

B

Resistance Substitution Box

This switched compact unit contains 12 resistors, with preferred values in the range 100ohm to 470ohm mounted on a printed circuit in a robust plastic box. Selection is via a rotary switch. External connections are by means of two 4mm yellow terminals, the colour indicating non-polarity. The tolerance of the resistance values is 5%. However, as is quite common, resistances can be closer to their nominal values. All the resistors have a maximum power rating of 1W.

Code: EDU086

£29.00


C
C

Bar Breaking Apparatus

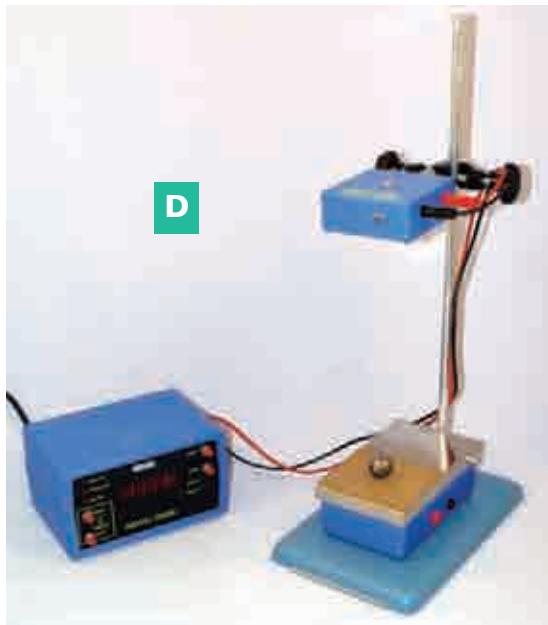
To show the forces which can be exerted during thermal expansion or contraction. Comprising a heavy cast iron frame 340 x 120 x 100mm with slotted end pillars to carry a stout iron bar. The bar is threaded at one end for a large tensioning nut and has holes at the other end to accommodate the cast iron breaking bars. Supplied with a pack of 10 breaking bars (code: EDU093).

Code: EDU092

£29.00

Code: EDU093 - Spare Bars, Pack of 10

£5.25


D
D

G By Free Fall Apparatus

The apparatus consists of an electromagnet housed in a plastic moulded case supplied with a heavy steel sphere, an electromagnet unit with connections for an external timer and a platform unit containing a microswitch and terminals for the external timer. Action: The sphere is released by moving the switch on the electromagnet to the upward position. This action simultaneously starts the timer. As the sphere hits the cork mat on the platform unit it activates a microswitch to turn off the timer. It is recommended that this be used in conjunction with the Laboratory Timer (code: EDU096) which has an in-built power supply for the electromagnet, or both can be purchased together as a combined set (code: GFF/SET).

Code: GFF

£40.00

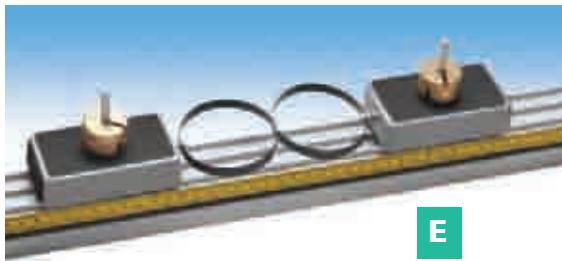
Code: GFF/SET - with Laboratory Timer **£195.00**

E Collision Kit

A simple and easy to use kit for work on momentum collisions and the coefficient of restitution. The kit consists of two bogies (velcro pad on one side, spring on the other); 1.2m long graduated track; pair of support feet; 2 photogate support holders and rods; mass set of 50g, 20g and 10g. Can be used with Timer & Gates (code: 251-413).

Code: 251-414

£140.00



E

F Timer & Photogates

A very versatile Photogate timer battery operated. There are five timing modes, including:

Interval mode which measures the time of interruption.
Frequency mode which measures frequency of regular interruption.

Period mode which measures the time between the first and third interruption.

Count mode which keeps track of the number of times the photogate beam is interrupted.

It also works as a normal stopwatch. Includes a pair of photogates, 9V battery and instructions.

Size 15 x 15 x 6cm.

Code: 251-413

£215.00



F

G Advanced 'G' by Free Fall Apparatus

This apparatus allows the study of free fall and pendulum levers. This system comprises the following:

Aluminium extrusion column with scale and metal base.

Electromagnet.

Free fall spheres.

Ball receiver.

Rod and clamp for attaching photogate onto the column.

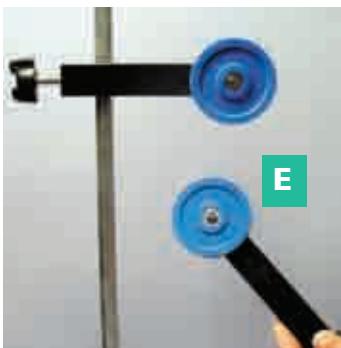
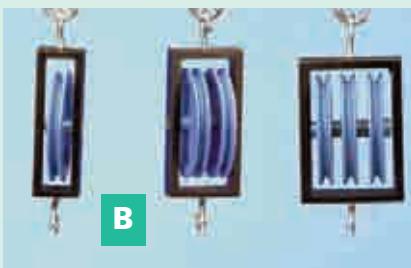
Compatible with timer and photogates code 251-413.

Code: 251-412

£99.00



G



A In-line Plastic Pulleys

Open sided frame with hooks at each end carrying pulleys with ball bearings. The open side frame allows for quick and easy stringing up as no threading is involved.

Code: BPULS - Single, 50mm	£3.50
Code: BPULD - Double, 50 & 38mm	£5.00
Code: BPULT - Triple, 50, 38 & 25mm	£6.00

B Plastic Pulleys

50mm diameter plastic pulleys with two hooks mounted in metal frame.

Code: PLPUKSP - Single	£1.50
Code: PLPULDP - Double	£2.15
Code: PLPULTP - Triple	£2.85

C Tandem Metal Pulleys

Open sided frame with hooks at each end carrying pulleys with ball bearings. The open side frame allows for quick and easy stringing up as no threading is involved.

Code: MPPULD - Double, 50 & 38mm	£4.50
Code: MPPULT - Triple, 50, 38 & 25mm	£4.95

D Metal Pulleys

50mm diameter pulley wheel mounted in metal frame with 2 hooks.

Code: MPULS - Single	£3.15
Code: MPULDP - Double	£3.75
Code: MPULTP - Triple	£5.25

E Rod Mounted Pulley

50mm diameter plastic pulley with ball bearing mounted on a 150 x 15mm diameter bar. Tapped holes are provided so that the nylon pulley (with ball bearing) may be fitted onto the boss with its axis of rotation in any one of the three planes.

Code: PULRDM	£14.50
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F Braided String

Ideal for use with pulleys. Stretch resistant. Will hold weight up to 13kg. 320m roll.

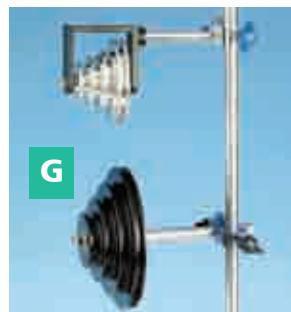
Code: 231-136	£14.50
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G Small Triple Differential Pulley

One-piece aluminium axle rod with 38, 50 and 62mm diameter pulley wheels, mounted within a metal frame with hook.

Code: PH0282A

£18.00



H Bench Mounting Pulley, 50mm

50mm diameter pulley carried on an aluminium boss 20 x 20 x 110mm, with a hole and clamping screw to accommodate rods up to 13mm diameter. Tapped holes are provided so that the nylon pulley (with ball bearing) may be fitted onto the boss with its axis of rotation in any one of the three planes.

Code: PBBB

£12.00



I Bench Mounting Pulley, 70mm

70mm diameter bench-mounting pulley, made of light alloy, on a brass/silvered-steel bearing held in an alloy bracket with two clamping screws for bench or rod support. The bracket may be clamped to a bench edge or similar support of up to 38mm thickness, screwed to a flat surface or held on a 13mm dia. support rod.

Code: PBM70

£12.95



J Bench Mounting Pulley, 'E' Shape

50mm dia. aluminium bench-mounting pulley; can be clamped to benches or boards of up to 28mm thickness.

Code: PBMES

£9.50



K Pulley Block Assembly

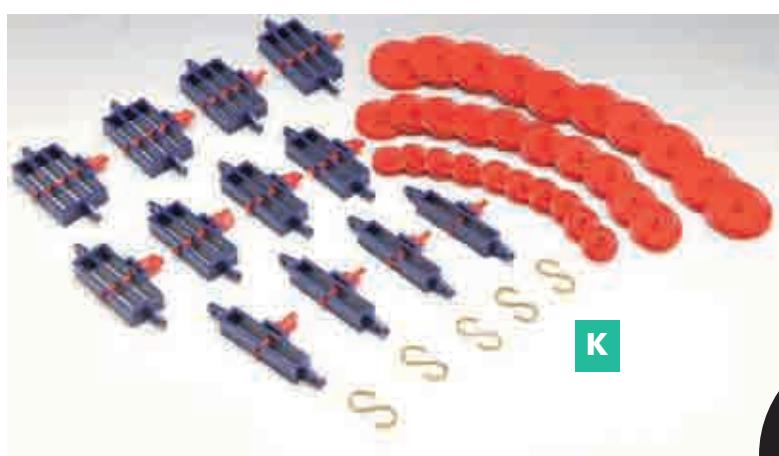
A set of components from which pulley blocks of many different configurations may be made. This versatile set is an economical alternative to using separate pulleys.

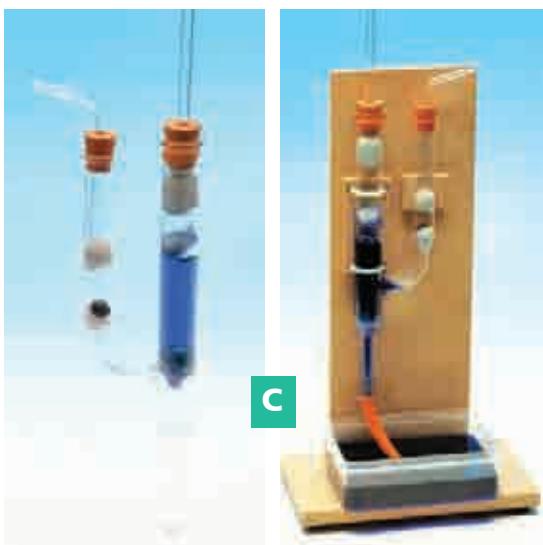
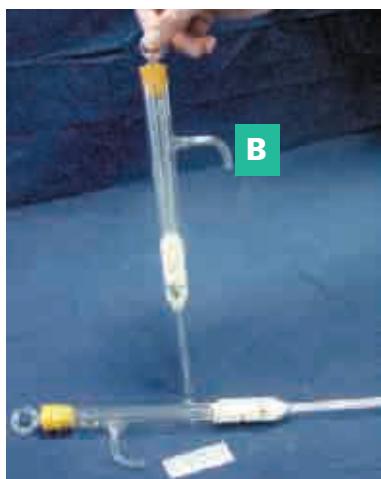
The set contains:

15 plastic pulley frames;
5 each of single, double and triple sheaves
- each provided with a removable bearing pin and a pair of hooks; 30 plastic plain bearing pulleys - 10 pulley wheels each of 25, 38 & 50mm dia.

Code: PH0292

£37.00





A Simple Machines Kit

Challenging experiments with levers, wheel and axle mechanisms, pulleys and an inclined plane, for teaching students the principles behind motion and leverage. Kit includes a Teacher's Guide.

Code: 4004

£150.00

B Lift Pump

Working model made of borosilicate glass.

Code: LMP

£15.00

C Force Pumps

Force pump constructed of high-quality borosilicate glass.

Code: PH0182A

£25.00

Code: PH0182B - Mounted on Stand

£45.00

D Mounted Manometer

Glass manometer with built-in stopcock mounted on backing plate. Scale 80-0-80 with 2mm subdivisions. Backplate dimensions: 400 x 80mm.

Code: MNMM

£20.00



E Hand Operated Vacuum Pump

A lightweight hand operated vacuum pump, drawing 15cm³ per stroke, up to a maximum vacuum of 50mmHg. It can be used to produce positive gauge pressures up to 2atm.

Code: 251-001

£105.00



F Liquid Level Apparatus

This apparatus can be used at an elementary level to demonstrate that several connected bodies of water will equalize at the same height due to the equal transmission of pressure through liquids, with gravity and air pressure, regardless of their shapes. More advanced variations on principles relating to pressure and liquids can also be explored.

Code: LILEV

£35.00



G Eureka Displacement Vessels

Displacement Vessels

Code: PH0116 - 100 x 50mm

£7.00

Code: PH0117 - 115 x 90mm

£12.75

Code: PH0118 - 225 x 125mm

£14.00





A

A

Pascal's Law Apparatus

Consists of a base into the top of which may be screwed one of a set of four vases of differing shape. An aperture in the bottom has a thin rubber diaphragm across it, bearing upon the short arm of a lever pointer. A movable index on the vertical rod enables the height of water in the vases to be set at the same level. The apparatus is mounted on a moulded plastic 25 x 17.5 cm base. The experiment is performed by screwing in each vase, in turn and filling with water to the same level. It will be seen that a given height of water will result in the same deflection of the pointer whatever shape the vase.

Code: 251-407

£195.00



B

B

Bernoulli Tubes

For demonstrating that when a fluid passes through a tube and reaches a constriction the fluid speed increases with a loss in pressure. Three side arms extend from the horizontal tube and allow the attachment of glass tubes to form simple manometers.

Code: PH0136

£19.00



C

C

Bucket & Cylinder

For demonstrating Archimedes' principle. This is a simple brass unit, suitable for class demonstration or individual use. The bucket has a suspension loop at the top and a hook at the bottom. The cylinder has a suspension hook at one end.

Code: BUCKCS - 50mm, overall 115mm **£6.95**

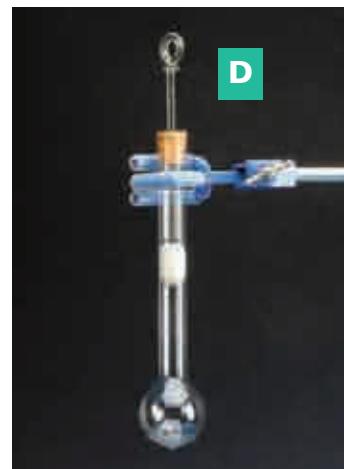
Code: BUCKSL - 60mm, overall 160mm **£12.00**

D Equality of Pressure in Liquids

To demonstrate the equal transmission by liquids of pressure in all directions. Comprising glass flask with holes and glass piston.

Code: PH0194

£24.00



E Spouting Cylinders

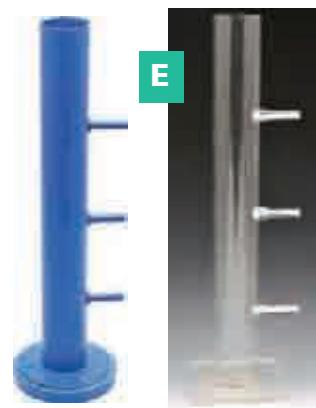
For demonstrating the principle that pressure increases with depth. Comprising a 60mm diameter pipe with 3 orifices of the same size, at different heights down one side. Height of cylinder: 400mm. The clear perspex version allows easy visibility of variation in the height of the liquid. .

Code: PH0196

£17.00

Code: PH0198 - Perspex

£32.00



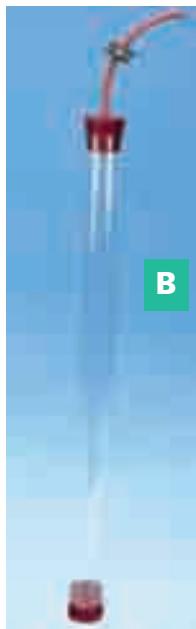
F Capillary Tube Apparatus

For demonstrating the relationship between capillary pressure and the bore diameter of the capillary tube. The apparatus comprises a metal frame holding six capillary tubes of different bores vertically in a trough. The trough is filled with water and the difference in height of the resulting columns of water is immediately clear. Overall height of frame: 90mm. Length of capillary tubes: 150mm.

Code: PH0202A

£12.00





A

Fluid Pressure Apparatus

For demonstrating the transmissibility of fluid pressure. The apparatus comprises two brass cylinders of 19mm and 38mm diameter, fitted with pistons and connected by a brass tube. The pistons are provided with rods terminating in the circular platform, each 75mm diameter, for loading with masses (not supplied). The complete apparatus is mounted on a base and the overall height with both pistons at the bottom of their cylinders is 245mm.

Code: PH0212

£40.00

B

Guinea & Feather Apparatus

Demonstrates that objects fall at the same speed, regardless of weight, in a vacuum. Consisting of a 16mm diameter glass tube 50cm long, fitted with two rubber bungs, and a 40cm length of tube for connection to a vacuum pump. Two objects with different weight and air resistance (e.g. a mass and a piece of paper or a feather) can be placed at the foot of the tube, and when inverted the objects will fall back to the bottom of the tube at the same rate - in a vacuum. Further studies of the effects of air resistance can be carried out, such as timing the fall of paper through variations of air pressure in the tube, to gauge the effects of air resistance on the acceleration of an object under gravity.

Code: PH0160

£24.00

C

Falling Bodies Apparatus

L-section launcher with holes for locating two 19mm diameter steel balls which act as projectiles. The launcher is released by push button and projects one ball forward while allowing the other to fall freely. The launching mechanism is mounted on a wooden block (size: 180 x 60 x 30mm) which may be bench clamped and has a convenient storage pocket for the balls. Apparatus comes complete with two steel balls.

Code: PH0318

£44.00

D Second Law of Motion Apparatus

The unit is based on a substantial metal casting and the entire mechanism is visible. The spring gun offers two tensions. The 25 cm long unit has a 10 mm rod. It may be horizontally clamped to a support stand or table clamp. Complete with two steel balls.

Code: 251-408

£25.00



E Projectile Launcher

Aluminium construction with hardened steel latches. String release trigger mechanism with 2 bore sights. Pivots from horizontal to 90°. 19 mm diameter ball with hole is easy to use – fixed launch position. Trajectories vary less than 1 cm because the ball does not spin when launched. Includes assembled spring loaded gun, two aluminium balls, protractor, plumb bob and operating instructions.

Code: 251-409

£78.00



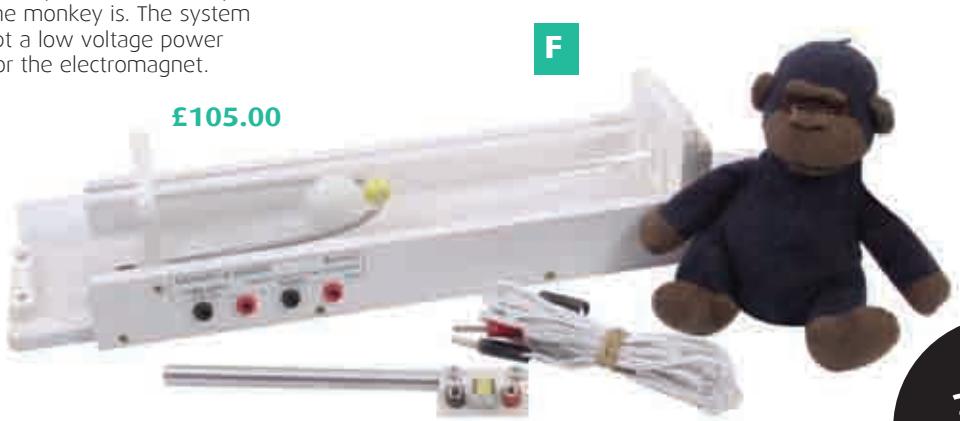
F Monkey & Hunter

An essential part of projectile studies is the 'monkey and hunter' problem. A monkey sees a hunter take aim. If he lets go when the hunter fires will he drop so that the bullet passes harmlessly overhead or should he sit still and watch the bullet pass harmlessly underneath since it is pulled down by the gravitational field? This apparatus allows for an interactive study of the problem by students.

A spring powered 'gun' fires ping pong ball 'bullets' at a model monkey supported from a small electromagnet. The electromagnet is switched off at the instant the projectile leaves the gun. Both monkey and bullet fall at the same rate and the bullet always hits the monkey regardless of how far away the monkey is. The system has everything required except a low voltage power supply and laboratory stand for the electromagnet.

Code: 30-680

£105.00





A

Hooke's Law Apparatus

To demonstrate that the relationship between the extension on a spring is proportional to the load applied to it. This complete apparatus has a 150mm adjustable mirror scale to prevent parallax error and is marked in millimetres and mounted on a sturdy 300mm rod. Attached to the rod is a hook supporting a coiled spring with a mass hanger and indicator. Supplied complete with a 250g slotted weight set, the apparatus is mounted on a wooden base.

Code: PH0323

£42.00

B

Strip Testing Clamps

A pair of aluminium clamps which allow strip material to be investigated for breaking strain, stretch etc. The clamps measure 65 x 50 x 20mm each and have wing-nut fixings and an attachment system which ensures freedom from slip. Typical investigations would include comparison of carrier bag material strength from various supermarkets, comparison of paper strength including the 'grain' of newspaper, stretch of fabrics and polythene, etc. Designed to hook on to the centre peg of a Forces Board System or a standard laboratory clamp. Loading of the bottom clamp is by means of standard slotted weights. Suitable for KS3 to A-Level.

Code: 560-533

£16.00

C

Wire Testing Clamps

Wire and thread testing is often carried out in a similar way to strip material but an effective gripping system is hard to achieve. These clamps solve the problem and are used in a similar way to the strip clamps (code: 560-533). Sold in Pairs. Max load 10kg. Full instructions supplied.

Code: 560-534

£16.00

D

Elastic Materials Kit

Containing:

2 x 130x50x50mm latex foam blocks; 4 elastic cords with eyelets; 4 soft rubber erasers; 1 x 900mm length of valve tubing; 2 x 40g reel of bare copper wire 0.28mm & 0.45mm diameter; 2 wide steel springs of 4.5 turns; 50mm diameter and 25 expandable steel springs with ends bent to form hooks for testing beyond the elastic limit.

Code: PH0324

£29.00

E Youngs Modulus Apparatus, 100mm

Vernier type apparatus for the experimental determination of the relationship between a load applied to a wire and the resulting extension. The apparatus consists of an engraved 10cm brass scale and vernier with 0.1mm precision, complete with tension weight. No load masses or wires (code: PH0330) supplied.

Code: PH0326

£89.00



F Youngs Modulus Apparatus, 0-30mm

Consists of a scale plate carrying a 0 to 30mm scale and a movable vernier readable to 0.1mm precision. Both have bars with clamping screws for the wires and hooks for the tension weight and loading masses. A ceiling clamp is provided for the upper ends of the wires, together with a pair of large wood screws for attaching it to a convenient overhead beam, door frame etc. A tension weight, mass 1.3kg approx., for the comparison wire is also included. (No load masses or wires supplied).

Code: PH0329

£89.00



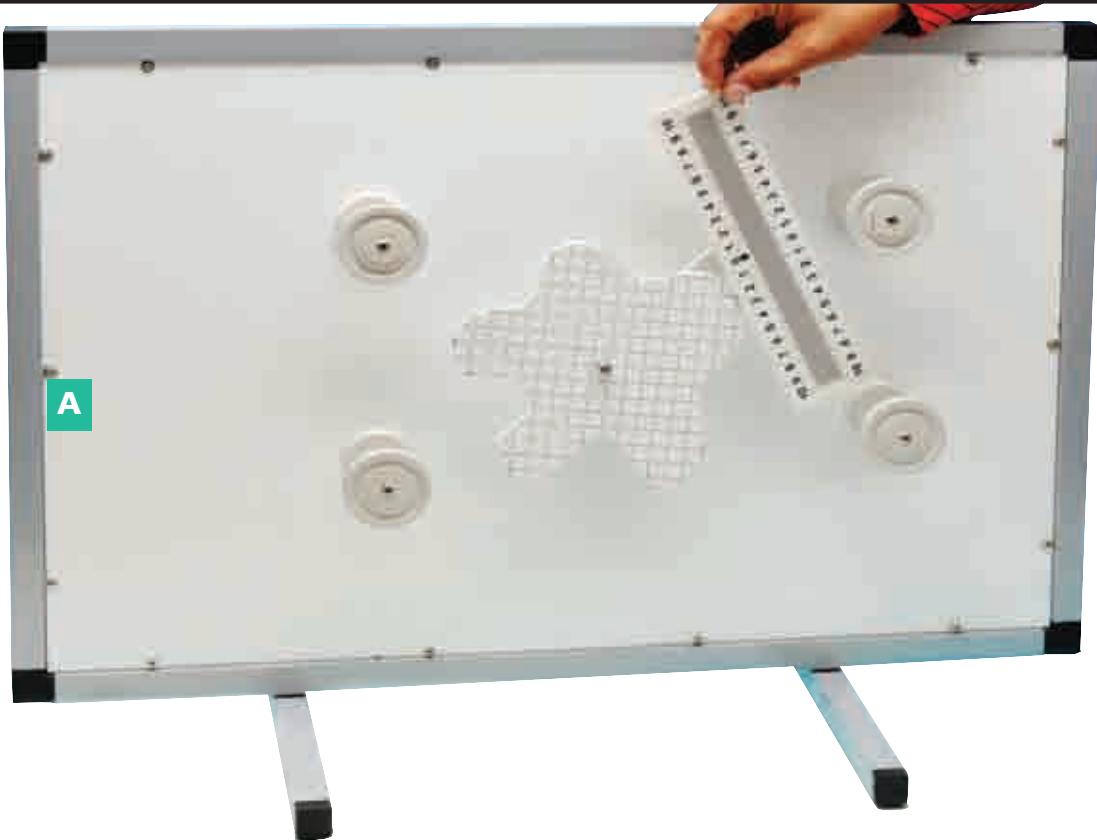
G Wires for Youngs Modulus Apparatus

A selection of six, 6m long wires for use with Youngs Modulus Apparatus: one each of 21 swg and 22 swg in brass, copper and stainless steel.

Code: PH0330

£9.00




A

A Moments Study Kit

The shaped body is designed to complete the course of statics and to allow practical measurements to be undertaken. It allows following experiments:

- Determination of centre of gravity of a solid
- Unstable equilibrium by reference to centre of gravity
- Moment of a force, theory of moments
- Study of couples
- Study of equilibrium of a solid under the action of several couples.

The kit consists of irregular shaped body, a system for measurement of distances, 4 pulleys on magnet, one roll of thread and one magnet on hook.

Code: 251-410

£155.00


B

B Wooden Lever, 1m

Fulcrum lever is graduated in centimetres and is balanced on the knife edge of the fulcrum by a transverse groove cut midway in the length of the lever. Supplied with 2 sets of 100g weights.

Code: PH0344

£39.00


C

C Levers Kit

Designed as a kit for eight pupils consisting of five plywood beams 600 x 44 x 3mm graduated every 38mm. Each has a groove across its centre to locate the fulcrum point. Also included are four fulcrums 32 x 32 x 64mm and forty 25mm square metal blanks. Masses of the blanks are matched to $\pm 1\%$.

Code: PH0340

£39.00

D Steel Extension Springs

Expandable steel springs for extension experiments. 15 mm dia, coiled length 20mm, overall length 55mm, wire diameter 0.7mm

Code: SPHK55A - 15x55mm, Pack of 200 £22.00



D

E Steel Extension Springs

Closely wound with loops at both ends, diameter 6mm, wire approx 19 swg. Length 225mm. Average extension for 200g load, 430mm.

Code: SP6225 - 16x225mm, Pack of 200 £79.00



E

F Brass Penny Weights

Each pennyweight is approx. 1.55g. Useful for balance experiments, particularly when used in conjunction with lever kit PH0340.

Code: EDU1097 - Pack of 40 £26.00



F

G Pendulum Ball

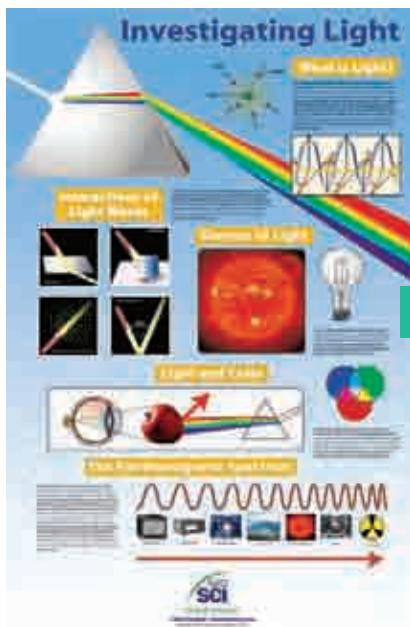
Comprising a solid sphere with a small hook for suspension.

Code: PBBR13 - Brass 13mm	£2.00
Code: PBBR19 - Brass 19mm	£2.50
Code: PBBR25 - Brass 25mm	£4.00
Code: PBLE13 - Lead 13mm	£1.25
Code: PBLE19 - Lead 19mm	£1.50
Code: PBLE25 - Lead 25mm	£2.75



G

LIGHT & OPTICS



A



B



C



D

A

Light Poster, 890 x 584mm

An illuminating look at light, its sources and applications.

Code: 44-35-1121

£29.00

B

Demonstration Green Laser

A battery operated green laser that may be used in classrooms without blackout facilities. The green laser light has a wavelength of 532nm, which is extremely close to the peak response of the human eye. This means that although the same power as red laser, the green laser light appears many times brighter. All our lasers contain Class 2 laser elements - Class 2 is the only type of laser approved for use in schools. The green laser raybox produces a bright spot of light for use in diffraction and holography experiments. The unit is powered by two AAA cells (not supplied).

Code: 241-522

£37.00

C

Semiconductor Laser

This laser emits an intense monochromatic red beam of wavelength 630 - 640nm at 0.9mW (Class II operation). Typical beam divergence is approximately 1 millirad. The laser beam can be modulated by applying an external digital or analogue waveform to the 3.5mm jack socket on the rear panel. Alternatively the beam can be modulated by the internal generator which produces 0.1µs pulses at approximately 1MHz. This allows speed of light experiments to be easily performed.

Code: 241-510

£205.00

D

Laser Pen

This inexpensive and lightweight laser pen is useful for ray optics demonstrations and simple diffraction work. In addition to this you can make your point on overhead images with this useful presentation tool.

Code: 712-004

£22.00

E Hand Held UV Lamp

A battery operated ultra violet light source suitable for Forensic Science investigations. Takes 4 x AA cell (not supplied). Fitted with 150mm UV fluorescent tube.

Code: 241-523

£20.00



F Spectroscope Kit

Students will get to see and appreciate the prismatic qualities of sunlight by using this 1" diameter diffraction grating spectroscope.

Code: 3091

£7.00

Code: 3093 - Pack of 15

£52.00



G Light Energy Kit

Help your students to understand the properties of light energy with this kit. 18 activities, including light transmission, light theory and colour, light sources, reflection, refraction and diffraction of light. Teacher's Guide included.

Code: 3981

£110.00



H Reflection, Diffraction & Refraction Kit

These hands-on experiments reveal the mystery of how light travels. This kit includes instructions for reflecting and refracting light, and includes light theories. A variety of translucent opaque objects and a Teacher's Guide are also included.

Code: 4003

£105.00



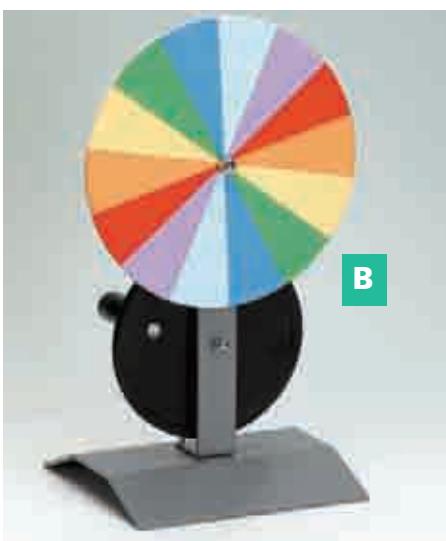


A Pinhole Viewer

With this device, students learn how the intensity of light and differently shaped lenses affect what the eye actually sees.

Code: 6016

£26.00



B Newton's Colour Disc, Belt Spin

Used for demonstrating that white light may be composed from all the spectral colours by rotation of the multi coloured disk. Mounted on a metal stand, the 180mm diameter disk is driven by a belt with the help of the hand driven wheel.

Code: P582F

£47.00



C Newton's Colour Disc, Hand Spin

Approx 200mm dia. Used to demonstrate how white light can be composed from a mix of primary colours.

Code: 241-001

£13.00



D Xenon Stroboscope

Edu-Lab's digital xenon stroboscope is a lightweight, sturdy and compact instrument. A variable flashing rate adjustment is an important feature of the stroboscope. A 240V, 50Hz power supply is required.

Specifications:

60 to 18,000 RPM, 0.2 to 300Hz. External triggering signal. Actual Size: 215 x 140 x 150mm.

Code: 241-002

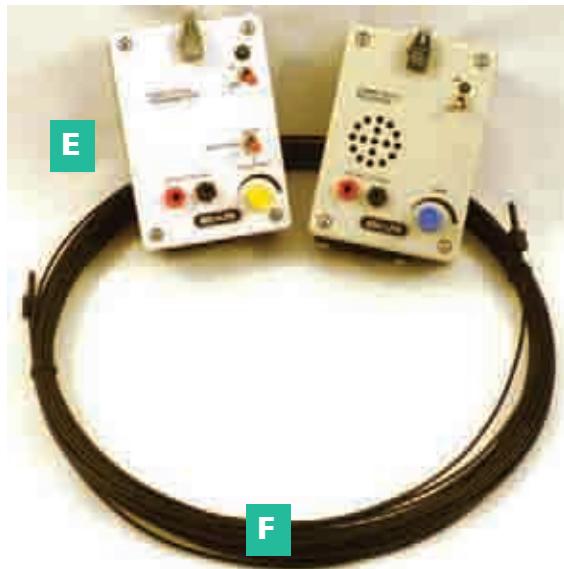
£205.00

E Fibre-Optics System

This set provides a self contained system for demonstrating and using a fibre optic data link. The transmitter unit is housed in a small plastic case and contains all the electronics for producing the modulated light source as well as an easily accessible PP3 battery compartment. A choice of modulation is available. A variable frequency audio tone in the range 1Hz-1kHz and a 250kHz square wave for speed of light investigations which is brought out to 4mm sockets for monitoring on an Oscilloscope. The receiver is in a similar case and contains a variable gain amplifier with integral loudspeaker as well as direct monitoring sockets for an oscilloscope. The system comes complete with 5m and 20m sheathed polymer optical fibre coils terminated with clip housings to mate with the transmitter and receiver units. The wavelength used is in the visible red part of the spectrum and with the modulation set at 1Hz the pulsing beam can be easily seen. Full instructions for use are included as well as details of the speed of light experiment. Note the speed of light determination requires a high quality 20MHz oscilloscope for monitoring the signal delay. An un-terminated 20m coil of polymer fibre (code: 280-217) is available as an extra for general fibre optic work.

Code: 241-005

£185.00



E

F

F Polymer Fibre Coil, 20m

An un-terminated 20m coil of polymer fibre for general fibre optic work.

Code: 280-217

£41.00



G

G Hartley's Rotatable Optical Disc

A 230 mm diameter disc marked from 0 to 360 degree at every 1 degree, with centre mark, on a stable base. The main disc and the lamp house with 12V, 24W bulb can be rotated and held in any desired position. With the lamp house, a rotatable disc with single, double, triple and quadruple slits and with adjustable lens carrier with lens for divergent, parallel or convergent light beams is provided. Optical elements provided for reflection are 50 mm wide. Optical element for refraction are semicircular, biconvex, biconcave, right angle prism and a trapezoidal acrylic blocks. These optical elements have powerful magnets attached for fixing of blocks to the disc.

Code: 241-515

£75.00

Code: 241-516 - Set of 6

£15.50

Optical Elements, in case - for use with Optical Disc.





A Light & Optics Kit

This kit is very useful for reflection, refraction and colour mixing experiments. The Mirrored Raybox (code: EDU528) consists of a light source (12V, 24W lamp) producing a convergent, divergent or parallel beam. On one end there is an adjustable cylindrical convex lens (for parallel beam) and a triple aperture system for colour mixing experiments at the other end. (Lateral aperture is provided with adjustable hinged mirror). All apertures in the box are provided with vertical channels to hold slit-plates and colour filters.

The optical set includes:

Acrylic blocks; a set of three mirrors; 2 black slit-plates, one with three narrow slits at one end and one narrow slit at the other, one with four narrow slits at one end and one wide slit at the other; a set of seven mounted colour filters.

Code: ESR23

£99.00



B Compact Light Source

Compact light source: a 12V, 100W quartz iodine lamp in a ventilated housing. Two adjacent sides have 19mm diameter apertures that can be used to produce an intense 'line' source, or end-on as a powerful 'point' source. The lamp housing is mounted on a stainless steel rod about 150mm x 10mm diameter. Supplied complete with an 80cm lead with twin 4mm plugs.

Code: 241-525

£69.00



C Stroboscope

Hand held model. Ideal for use with Ripple Tank (code: EDU044) and other wave and motion studies.

Code: EDU767

£17.00

D Raybox Accessories

Code: CFSET6 - Colour Filters, Set of 7	£6.00
Code: EDU656 - Slit-Plates, 1 Single/1 Triple	£2.95
Code: RAYBULB - Spare Bulb	£2.45

E Raybox with Accessories

The raybox can be used in a single-ray mode without using the plano-convex lens. However, with the lens inserted (plane face towards the light source), and using the two-slit, three-slit or broad-slit masks, the emergent light can be made to be divergent, convergent or parallel by adjusting the position of the light source in relation to the lens. These facilities enable the raybox to be used in a wide range of optical experiments with transparent flatbased blocks, prisms and mirrors.

The coloured filters can be used to produce beams of coloured light, but external light levels have to be reduced for maximum effectiveness. Base measurements: 180 x 65 x 75mm. The light source is mounted under an adjustable lid, designed so that minimum light emerges in unwanted directions. Power requirement: 12V (AC or DC) connected to two 4mm sockets on the raybox. Light source: 12V, 10W line-filament bulb, length 43mm.

Accessories:

Plano-convex lens of focal length 75mm; 2 plastic masks with, respectively, one and two thin slits, three thin slits and one broad slit; 7 coloured filters and 1 tri-colour filter, mounted in 50 x 50mm plastic frames; 1 spare 12V 10W bulb.

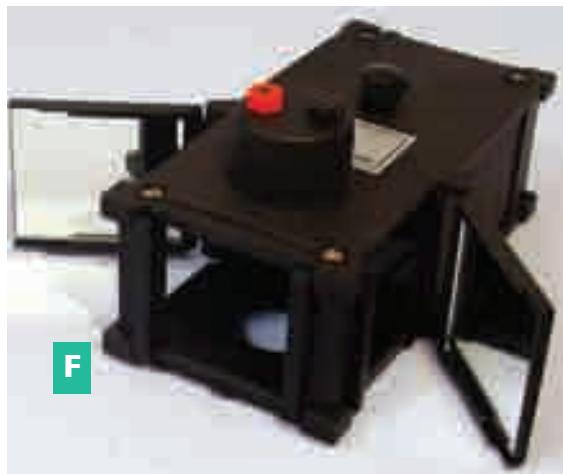
Code: EDU039N **£22.00**



F Raybox without Accessories

As supplied in the Light & Optics Kit (Code: ESR23) but with no accessories included.

Code: EDU528 **£37.00**

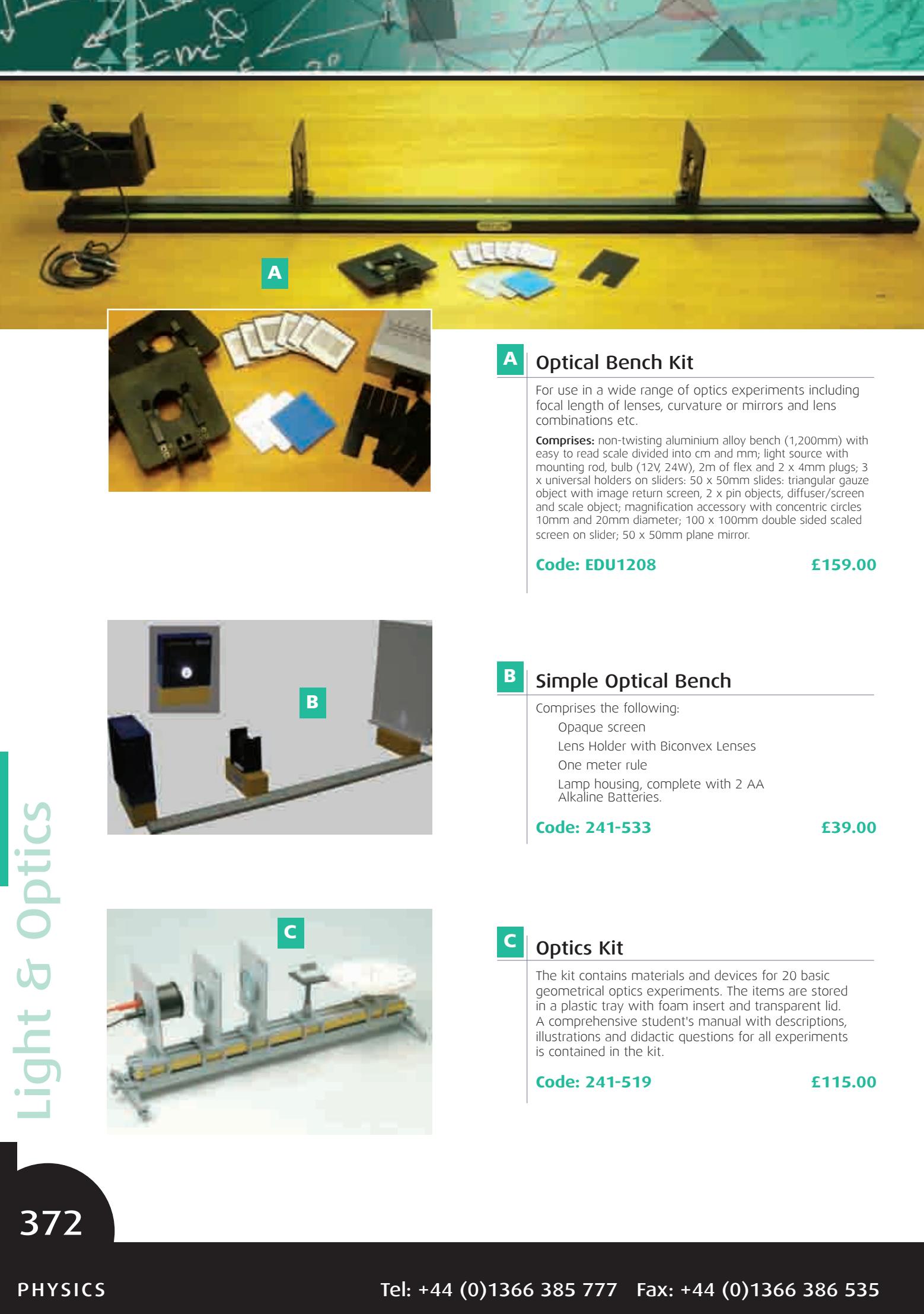


G Ray Box (12v)

Used for a wide range of optics experiments with this high quality, robust ray box. Designed with two slots to hold blanking plates, seven grooves for lenses. Supplied with 12V, 24W, bulb, holder, slit plates, blanking plates and instructions.

Code: EDU1207 **£34.00**





A



A

Optical Bench Kit

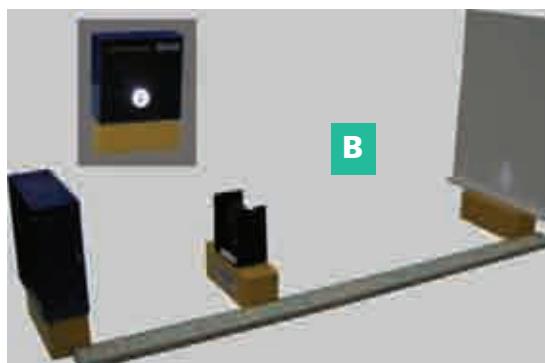
For use in a wide range of optics experiments including focal length of lenses, curvature of mirrors and lens combinations etc.

Comprises: non-twisting aluminium alloy bench (1,200mm) with easy to read scale divided into cm and mm; light source with mounting rod, bulb (12V, 24W), 2m of flex and 2 x 4mm plugs; 3 x universal holders on sliders; 50 x 50mm slides: triangular gauze object with image return screen, 2 x pin objects, diffuser/screen and scale object; magnification accessory with concentric circles 10mm and 20mm diameter; 100 x 100mm double sided scaled screen on slider; 50 x 50mm plane mirror.

Code: EDU1208

£159.00

B



B

Simple Optical Bench

Comprises the following:

Opaque screen

Lens Holder with Biconvex Lenses

One meter rule

Lamp housing, complete with 2 AA Alkaline Batteries.

Code: 241-533

£39.00

C



C

Optics Kit

The kit contains materials and devices for 20 basic geometrical optics experiments. The items are stored in a plastic tray with foam insert and transparent lid. A comprehensive student's manual with descriptions, illustrations and didactic questions for all experiments is contained in the kit.

Code: 241-519

£115.00

D Optical Bench Kit, 12V, 24W

Wooden optical bench with accessories. 1.5 metres long with millimetre divisions. Mounted accessories: Lamp housing with white lamp; white metal object screen of 75mm diameter; lens holder for 38mm diameter lenses; object needle mounted on 6mm metal rod; plane mirror in metal frame, 100x75mm; white metal receiving screen with slot for squared paper.

Code: PH0666

£85.00



E Optical Pins

Code: 241-512 - Pack of 100

£3.75



F Diffraction Demonstration Slide

For demonstrating the principle of the diffraction grating and the way in which its properties are dependent upon the number of lines per unit length. Comprises a card mount 90 x 40mm with three 16 x 9mm apertures containing diffraction grating replicas of 100, 300 and 600 lines/mm.

Code: EDU949

£17.00



G Diffraction Gratings

Overall Size 50 x 50mm. Aperture Size 36 x 24mm. Mounted between two glass protecting plates.

Code: EDU946 - 80 lines per mm **£11.00**

Code: 241-508 - 100 lines per mm **£11.00**

Code: EDU947 - 300 lines per mm **£11.00**

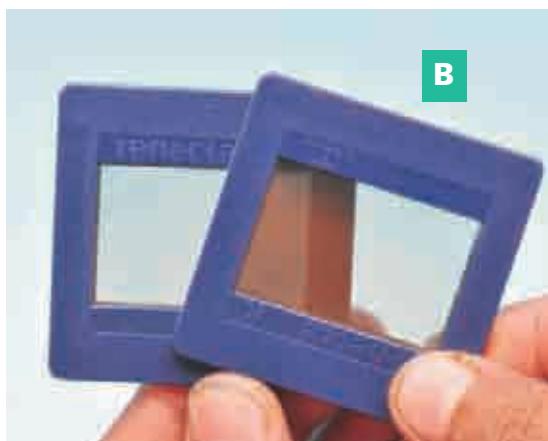
Code: EDU948 - 600 lines per mm **£13.00**



**A**

Polarising Filter Stress Demonstrator

This large scale demonstrator comprises of 5 inch polarising sheets mounted on a graduated frame and placed on a wooden stand. It is supplied with clear acrylic pieces of different shapes so different stress patterns can be demonstrated. In this demo, the clear pieces with different shapes are placed between the filters and squeezed. Stress patterns then can be observed.

Code: 241-517**£99.00****B****B**

Polaroid Sheet

Polaroid sheet mounted in square plastic frame.

Code: 241-518**£10.00****C****C**

Colour Paddle

For simple experiments in subtractive colour mixing. 3 Primary Colours and 3 Secondary Colours. Filters riveted by plastic rivet. Dimension 50mm x 73mm approx. L x W.

Code: 241-524**£8.00**

D Light Guide Demonstrator

An 'S' shaped acrylic bar 220 x 20 x 20mm which can be used with a Raybox to demonstrate total internal reflection. It helps students to understand the principles of optical communications. The bottom of the bar is painted white to aid visibility.

Code: WB005

£34.00



E Wooden Lens Holder

A wooden holder to take lenses or mirrors up to 76mm diameter. Comprising an upright 100mm high with V-shape slot to hold a convex or concave lens, mounted on a rectangular base 100 x 50mm. An index mark is engraved on each end of the base.

Code: P550/F

£2.60



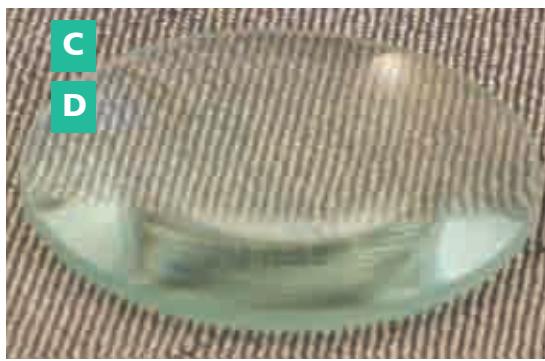
F Slide Support Lens Holder

Plastic lens holder suitable to house lenses up to 50mm. Mounted on base. Used in conjunction with Light & Optics experiments. Simple locking ring holds lens firmly in position.

Code: EDU734 - Pack of 5

£17.00





Lenses

High quality precision finished lenses of different focal lengths for a variety of light and optics experiments.

A Biconcave Lenses, 38mm dia.

Code: LBVS050	- FL: 50mm, Pack of 20	£25.00
Code: LBVS100	- FL: 100mm, Pack of 20	£25.00
Code: LBVS150	- FL: 150mm, Pack of 20	£25.00
Code: LBVS200	- FL: 200mm, Pack of 20	£25.00
Code: LBVS250	- FL: 250mm, Pack of 20	£25.00
Code: LBVS300	- FL: 300mm, Pack of 20	£25.00
Code: LBVS500	- FL: 500mm, Pack of 20	£25.00

B Biconcave Lenses, 50mm dia.

Code: LBVL050	- FL: 50mm, Pack of 20	£25.00
Code: LBVL100	- FL: 100mm, Pack of 20	£25.00
Code: LBVL150	- FL: 150mm, Pack of 20	£25.00
Code: LBVL200	- FL: 200mm, Pack of 20	£25.00
Code: LBVL250	- FL: 250mm, Pack of 20	£25.00
Code: LBVL300	- FL: 300mm, Pack of 20	£25.00
Code: LBVL500	- FL: 500mm, Pack of 20	£25.00

C Biconvex Lenses, 38mm dia.

Code: LBXS050	- FL: 50mm, Pack of 20	£25.00
Code: LBXS100	- FL: 100mm, Pack of 20	£25.00
Code: LBXS150	- FL: 150mm, Pack of 20	£25.00
Code: LBXS200	- FL: 200mm, Pack of 20	£25.00
Code: LBXS250	- FL: 250mm, Pack of 20	£25.00
Code: LBXS300	- FL: 300mm, Pack of 20	£25.00
Code: LBXS500	- FL: 500mm, Pack of 20	£25.00

D Biconvex Lenses, 50mm dia.

Code: LBXL050	- FL: 50mm, Pack of 20	£25.00
Code: LBXL100	- FL: 100mm, Pack of 20	£25.00
Code: LBXL150	- FL: 150mm, Pack of 20	£25.00
Code: LBXL200	- FL: 200mm, Pack of 20	£25.00
Code: LBXL250	- FL: 250mm, Pack of 20	£25.00
Code: LBXL300	- FL: 300mm, Pack of 20	£25.00
Code: LBXL500	- FL: 500mm, Pack of 20	£25.00

E Meniscus Lenses, 50mm dia.

Code: LEME11D - +11D	£7.00
Code: LEME25D - +2.5D	£7.00
Code: LEME3D - +3D	£7.00
Code: LEME55D - +5.5D	£7.00
Code: LEME8D - +8D	£7.00



F Cylindrical Glass Lenses

High quality precision finished lens for a variety of light and optics experiments. Individually pouched and supplied in a neat presentation case. Focal Length: 75mm. Size: 50mm (H) x 45mm (W)

Code: CYLEN11 - Planoconcave, Pack of 5	£13.00
Code: CYLEN01 - Biconvex, Pack of 5	£6.00
Code: CYLEN05 - Biconcave, Pack of 5	£6.50
Code: CYLEN10 - Planoconvex, Pack of 5	£7.00



G Lenses

50mm diameter lenses with ground and polished faces and ground edges. One each of double convex, plano-convex, converging concave-convex, diverging concave-convex, double concave and planoconcave. Supplied in wooden box.

Code: P538 - Set of 6	£6.50
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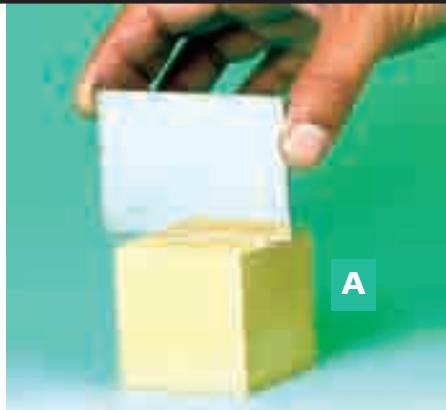
H Lens Set

Consisting of:

Biconcave, 50mm. Focal length: 100mm
 Biconcave, 50mm. Focal length: 150mm
 Biconvex, 50mm. Focal length: 100mm
 Biconvex, 50mm. Focal length: 150mm

Code: EDU144 - Pack of 4	£17.00
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A Mirror Support Block

A slotted wooden block for supporting mirrors.
50 x 50 x 50mm.

Code: PH0516 - Pack of 10

£15.76



B Plane Glass Mirrors

Optically worked glass. Silver backed with protective coating. Unmounted.

Code: EDU909 - 50x50mm, Pack of 10 **£4.95**

Code: EDU908 - 50x 100mm, Pack of 10 **£6.00**

Code: PH0514A - 75x25mm, Pack of 10 **£2.95**

Code: PH0514B - 75x50mm, Pack of 10 **£4.15**

Code: PH0514C - 100x75mm, Pack of 10 **£6.15**

Code: PH0514D - 150x 25mm, Pack of 10 **£6.15**

Code: PH0514E - 150x 50mm, Pack of 10 **£6.30**



C Concave Glass Mirrors, 50mm dia.

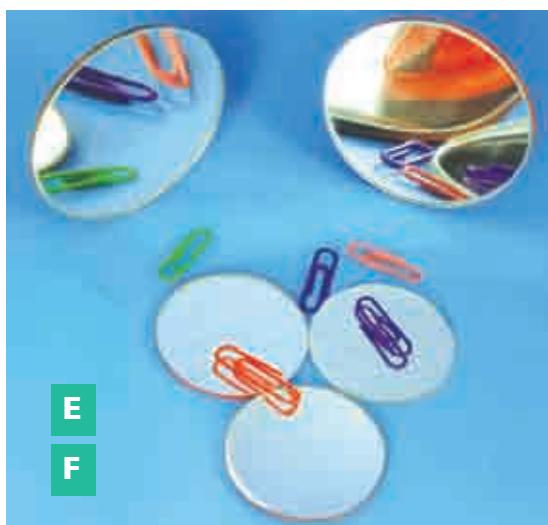
Code: PH0520B - FP: 75mm, Pack of 10 **£12.50**

Code: PH0520C - FP: 100mm, Pack of 10 **£12.75**

Code: PH0520D - FP: 150mm, Pack of 10 **£13.00**

Code: PH0520E - FP: 200mm, Pack of 10 **£13.25**

Code: PH0520F - FP: 300mm, Pack of 10 **£13.50**



E Convex Glass Mirrors, 50mm dia.

Code: PH0526B - FP: 75mm, Pack of 10 **£12.50**

Code: PH0526C - FP: 100mm, Pack of 10 **£12.75**

Code: PH0526D - FP: 150mm, Pack of 10 **£13.00**

Code: PH0526E - FP: 200mm, Pack of 10 **£13.25**

Code: PH0526F - FP: 300mm, Pack of 10 **£13.50**

F Convex Glass Mirrors, 75mm dia.

Code: PH0526L - FP: 300mm, Pack of 10 **£13.65**

G Giant Acrylic Prisms

Clear polished acrylic prisms for optics experiments.

Code: GACB1	£14.00
- Equilateral Triangle, 190 x 190 x 190mm x 25mm (thick)	
Code: GACB2	£14.00
- Isosceles Triangle, 185 x 135 x 135mm x 25mm (thick)	
Code: GACB3	£14.00
- Rectangular - 190 x 120mm x 25mm (thick)	



H Acrylic Prisms, Rectangular

Code: ACB010	£4.95
- Rectangle, 75 x 50mm x 25mm (thick)	
Code: PH0568B	£5.00
- Rectangular, 100 x 65mm x 18mm (thick)	



I Acrylic Prisms, Triangular

Code: PH0560A	£2.75
- Equilateral Triangle, 38 x 38 x 38mm x 18mm (thick)	
Code: PH0562A	£2.50
- Right-angled Triangle, 35 x 25mm x 18mm (thick)	



J Acrylic Prism Pair, Triangular

Code: PH0564	£5.25
- Isosceles Triangle, pair, 15 x 60 x 20mm x 18mm (thick)	



K Acrylic Prisms, 25mm

Code: ACB011	£4.95
- Biconvex, 75 x 115mm	
Code: ACB012	£4.95
- Biconcave, 75 x 115mm	
Code: ACB013	£4.95
- Semi-circular, 75mm dia	
Code: ACB014	£4.95
- Equilateral Triangle, 60 x 60 x 60mm	
Code: ACB015	£4.95
- Isosceles Triangle, 90 x 45 x 45mm	
Code: ACB016	£4.95
- Right-angled Triangle, 90 x 60 x 30mm	





A

A

Acrylic Prism Set

Consists of 7 blocks, all faces fully polished: Rectangle 75 x 50mm; Semi-circular 75mm dia.; Triangle 60 x 60 x 60° with 58mm side; Triangle 90 x 45 x 45° with 75mm hypotenuse; Triangle 90 x 60 x 30° with 75mm hypotenuse; Bi-convex, 75mm long curved faces, 100mm radius; Bi-concave, 75mm long curved faces, 100mm radius, 25mm thick.

Code: ACB017

£34.00



B

B

Acrylic Prisms, Semi-circular

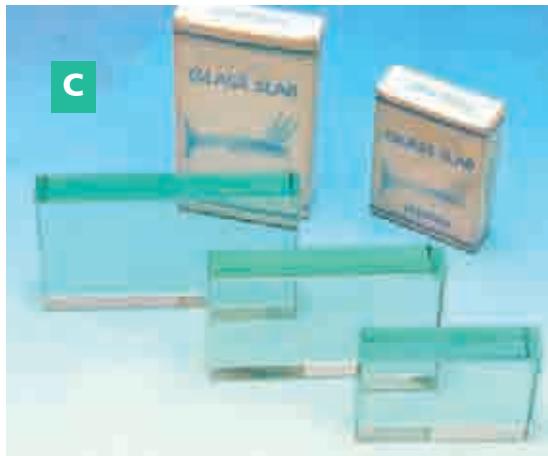
Clear polished acrylic prisms for optics experiments.

Code: PH0570A - 90 x 16mm (thick)

£2.65

Code: PH0570B - 90 x 25mm (thick)

£2.65



C

C

Glass Prisms, Rectangular

High quality glass with optically worked surfaces. All angles accurately worked. The edges are slightly bevelled and the glass completely bubble-free.

Code: PH0566A - 75 x 50 x 12mm

£2.50

Code: PH0566B - 75 x 50 x 18mm

£2.75

Code: PH0566C - 100 x 60 x 18mm

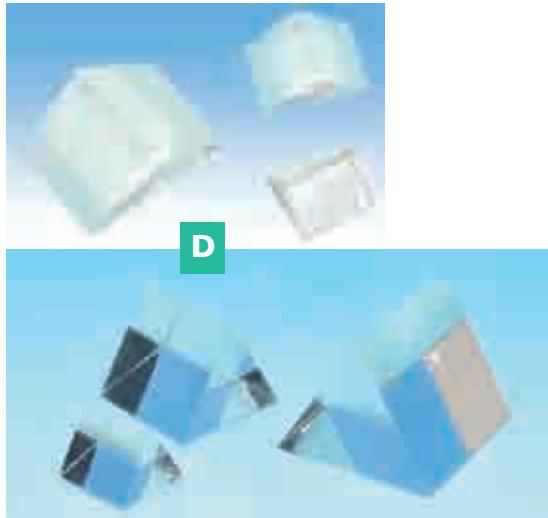
£4.25

Code: GBREC - 115 x 65 x 18mm

£6.95

Code: PH0566E - 125 x 65 x 18mm

£4.25



D

D

Glass Prisms, Triangular

High quality glass with optically worked surfaces. All angles accurately worked. The edges are slightly bevelled and the glass completely bubble-free.

Code: PRISM

£3.25

- Triangle, 90 x 60 x 30°

Code: PRIG38

£2.95

- Right-angled Triangle, 38 x 38mm

Code: PRIG50

£4.25

- Right-angled Triangle, 50 x 50mm

Code: PRMEQ38

£5.25

- Equilateral Triangle, 38 x 38mm

Code: PREMQ50

£5.50

- Equilateral Triangle, 50 x 50mm

Code: PH0556A

£2.45

- Equilateral Triangle, 25 x 25mm

Code: PH0558A

£2.45

- Right-angled Triangle, 25 x 25mm

E Glass Prisms, Semi-circular

Semi-circular, block prisms with fully polished faces.

Code: PH0570C - 90 x 16mm (thick) £4.25



F Spectrometer Prisms

Optically worked prisms for use with Spectrometer.
Equilateral triangle, two faces polished. 32 x 32mm.

Code: PH0583A £26.00

- Borosilicate Glass Crown R Index 1.51

Code: PH0583B £36.00

- Flint Glass Dense R Index 1.62

Code: PH0583C £48.00

- Extra Dense Glass Flint R Index 1.65

Code: PH0583D £58.00

- Double Extra Dense Glass Flint R Index 1.71-1.74



G Newton's Ring Apparatus

Pair of 60mm diameter optically polished glass plates, one plane and the other plano-convex, mounted together in a metal frame. The pressure between the plates is adjustable by three brass, nickel-plated screws.

Code: PH0584 £29.00



H Pinhole Camera Kit

The kit consists of 8 boxes 150 x 100 x 100mm with hole, screen and lid; filament lamp; 50 sheets of black paper 200 x 250mm; one 60W lamp; one mounted lamp holder with flex; one packet of pins. Uses a basic pinhole camera to show the principles of image formation.

Code: PH0607 £19.95




A

A

Standard Spectrometer

An economically priced instrument which is capable of useful quantitative work. The main structural parts, including the collimator and telescope bodies are high quality castings. All metal parts are well coated with high quality finishes.

SCALE: 170mm diameter, divided 0 to 360° x 1°, independently rotates with locking screw. A spring loaded Vernier scale attached to the telescopic mount provides readings to 0.1°.

COLLIMATOR: Mounted on fixed pillar with axis adjustment. Objective lens has 150mm focal length, aperture of 212mm and is carried in spiral focusing system. Unilaterally adjustable slit 6mm.

TELESCOPE: Mounted on movable pillar with adjustment by a locking screw and axis adjustment. Objective lens has 170mm focal length, 21mm aperture and is carried in a spiral focussing system. Ramsden eyepiece with cross wires and locking ring focus adjustment.

PRISM TABLE: The table is provided with three levelling screws and has lines marked to assist placement of prism.

STANDARD ACCESSORIES: Includes 1 prism clamp for prisms up to 40mm high, 1 diffraction grating holder, aperture 25 x 25mm, 1 small screwdriver, 1 tommy bar for axis adjustment. Instructions.

Code: PH0619

£299.00


B
B

Direct Vision Spectroscope

For the rapid examination of spectral composition of white light sources. This instrument gives a brilliant spectrum with a dispersion of approx. 11°. The slit is of variable width and adjusted by rotating the end piece. Supplied in a wooden case. 80 lines per mm.

Code: P594

£44.00


C
C

Advanced Spectrometer

This instrument is specifically designed for advanced work but is sufficiently robust for individual student use. It is capable of high performance. The main structure is of heavy cast metal with bright plated fittings. The instrument is mounted on a baseboard which fits into a polished hardwood case.

SCALE: 177mm diameter circle is fixed. The table and telescopic movements are completely independent of each other. Both movements can be read to 30sec. of arc by means of double ended verniers. Both rotations have fine adjustment screws. Release of a clamping screw enables coarse adjustment to be made manually.

COLLIMATOR: Mounted on a fixed pillar and fitted with 178mm focus achromatic objective with 32mm clear aperture.

TELESCOPE: Mounted on a movable pillar and fitted with 178mm focus achromatic objective with a 32mm clear aperture. Also fitted is x15 Ramsden eyepiece and a glass cross line graticule.

PRISM TABLE: The table is marked with lines to assist placing the prism with respect to the table levelling screws and has interchangeable clamping units for the prism and a diffraction grating.

Code: PH0620

£995.00

D Spectral Lamp Power Supply with Lamp Holder

Spectral lamps produce monochromatic light at high intensity. Edu-Lab's spectral lamps have a glass tube with an inner discharge column. The discharge column contains the gas.

Code: 241-004

£255.00



E Spectral Lamps

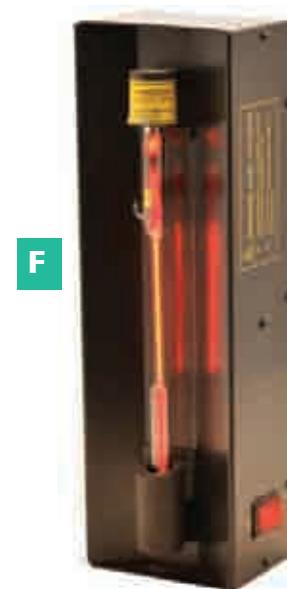
Code: 241-500 - Sodium	£230.00
Code: 241-521 - Mercury	£230.00

F Spectrum Tube Stand with Power Supply

Specially designed box holds the tube firmly and prevents the student from touching the electrodes. A black panel behind the tube eliminates distracting ambient light and protects the tube from breakage. Operates on 220V A/C at 50Hz and is suitable for 20/26 cm tubes.

Code: PH1197A

£195.00



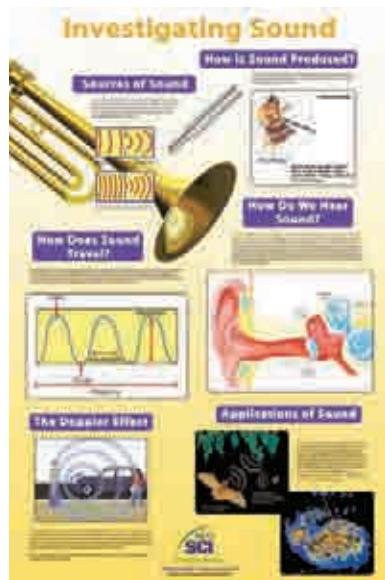
G Spectrum Tubes, 260mm

Spectrum tube, straight form, 260mm length with 50mm long fine capillary tube. It is recommended for use in conjunction with the Spectrum Tube Holder with Power Supply (code: PH1197A).

Code: PH1196B1 - Oxygen	£15.00
Code: PH1196B2 - Neon	£15.00
Code: PH1196B3 - Helium	£15.00
Code: PH1196B5 - Nitrogen	£15.00
Code: PH1196B6 - Argon	£15.00
Code: PH1196B7 - Carbon Dioxide	£15.00
Code: PH1196B8 - Iodine Vapour	£15.00
Code: PH1196B9 - Hydrogen	£15.00
Code: PH1196B10 - Sulphur	£15.00
Code: PH1196B11 - Krypton	£15.00
Code: PH1196B12 - Xenon	£15.00



SOUND & WAVES



A

Ultrasonic Apparatus

Demonstrate the wave nature of sound at relatively short wavelength. Investigate reflection interference of sound waves etc. Transmit speech over microphone or set up a voice link with an FM radio. The equipment operates at a frequency of 40KHz giving a wavelength in air of approximately 8.3mm.

Comprising: Ultrasonic's transmitter; Ultrasonic receiver; Ultrasonic slave transmitter.

Code: 241-534 - Mini set £195.00

Code: 241-535 £295.00

- Mini set with 2 Aluminium reflectors and perforated plate

B

Speed of Sound Kit

The kit is extremely simple to set up and use, and provides accurate and precise measurements for the speed of sound in air. What's more, the included micro-second timer doubles as a start-stop microsecond or millisecond timer, for use with light gates or mechanical switches in a wide range of other experiments. The kit comes with two condenser microphones (including leads), to be placed a metre apart and used as start-stop signals detecting the passing sound wave, and suitable tools for generating the correct type of sound.

Code: 241-513 £145.00

C

Sound Poster, 890 x 584mm

A graphic illustration of sound's sources; how it is produced and heard; how sound travels; the role of sound waves; the Doppler Effect; the applications of sound and more!

Code: 44-35-1116

£29.00

D Sound Spectrum Chart, 850 x 610mm

Did you know that a vibrating guitar string moves the air and produces sound? This unique chart presents ingredients of sound including pitch, tone, pressure and vibration. An activity guide provides ideas for experimentation.

Code: 4101

£23.00



E Sound Energy Kit

Students investigate the physics behind sound energy in this kit. These activities include sound wave theory, reflection of sound, force of sound waves and transmission, and many more. Teacher's Guide included.

Code: 3983

£105.00



F Mini Speaker

A miniature loudspeaker, fully enclosed in a white plastic case, suitable for connection to a tone generator for demonstration of the production of sound waves from electrical signals. Size 100 x 75 x 40mm.

Code: 230-105

£22.00



G Bell in Glass Vacuum Jar

A versatile unit for demonstrating the properties of a vacuum. Comprises a sturdy baseplate with tap, glass bell jar and detachable battery operated bell. Use with hand pump (code: 251-001) or ideally with electric vacuum pump (code: 612-001).

Code: 241-003

£69.00



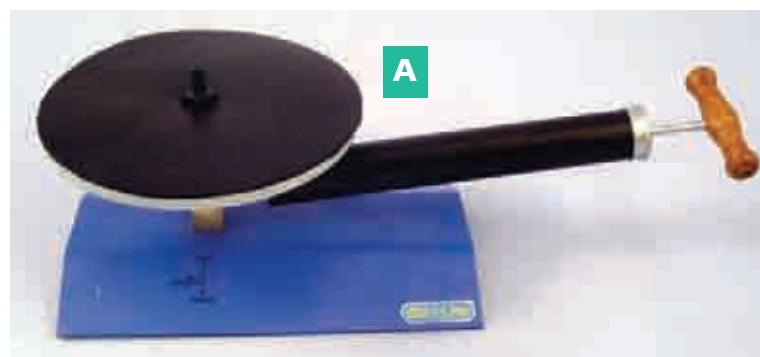
H Bell in Acrylic Vacuum Jar

To demonstrate part of the nature of sound waves by showing that sound does not exist in a vacuum. Bell housed in acrylic jar for safety. Dimensions: 250 x 140mm

Code: 241-507

£99.00

H

**A****A****Vacuum Plate with Integral Hand Pump**

For use with bell jars, for example, to create a vacuum environment for experiments. 250mm diameter.

Code: P164C**£85.00****B****B****Electric Bell**

Simple dome, double-gong bell with detachable cover. Threaded metal terminals are provided for easy connection. Diameter approximately 75mm.

Code: PH1030A**£5.75****C****C****Pump Plate**

Robust free-standing pump plate available in three sizes. Supplied with tube for connection to pump and with a stopcock for air regulation on the central pillar. Tripod style base. Suitable for vacuum physics experiments.

Code: P156A - 175mm dia.**£47.00****Code: P156B - 200mm dia.****£68.00****Code: P156C - 250mm dia.****£78.00****D****D****Loudspeaker Unit**

75mm dia., 8 ohm and 5W nominal power mounted in an ABS plastic box with two 4mm sockets. Provides a useful level of sound over the whole audio range. Comes with bosshead for retort stand mounting. Dimensions : 150mm x 98mm x 60mm.

Code: 241-531**£24.95**

D Signal Generator & Amplifier

Specification:

Frequency Range: 0.1 Hz to 99.9 KHz in six decades, read on digital display
 Frequency Accuracy: 0.01% (100 ppm) in all ranges
 Output waveform: Sine, Rectangular and Triangular
 High Impedance Output: Maximum 17V peak to peak from internal source impedance of 600ohm
 Low Impedance output: 6V R.M.S. at 4ohm (about 8.8V peak for all waveforms)
 Maximum Power output of 4.5W available over the entire frequency range for all waveforms
 Maximum Power Transfer occurs when the load is 4ohm, giving $62/(4+4) = 4.5W$
 Amplitude Control: Variable from zero to maximum output in 256 increments, amplitude is displayed by a 10 segment bar graph
 Attenuation: x1, x 0.1, x 0.01, $\pm 1\%$, operating only on the 600ohm output
 Amplifier voltage gain: 100; Frequency Response: DC to 100KHz, -3 dB, output power 4.5W into 4ohm load
 Controls: All control settings except amplitude are stored and updated upon any changes
 Electric Supply: 220V~240V, 50Hz
 Dimensions: approx. 210mm x155mm x 118mm L X W x D
 Weight : Approx. 2.05kg, without power cord
 CE marked.

Code: 241-022

£275.00



E Ultrasonic System

This apparatus consists of a self-contained transmitter and receiver operating in the 40kHz region. The transmitted wave is modulated at a variable frequency of about 2kHz and this is detected by the receiver which amplifies the signal and drives a miniature integral loudspeaker. Both transmitter and receiver are contained in separate plastic enclosures measuring 60 x 100 x 25mm which contain all the electronics and the 9V batteries.

The receiver has front-panel 4mm sockets so that the output can be monitored on an oscilloscope for more quantitative measurements. A special feature is the second output transducer on the transmitter which can be switched on when required. This then becomes a twin coherent source, and by moving the receiver interference patterns can be dramatically demonstrated. The system is ideal for demonstrating sound waves above the hearing threshold and reflection properties associated with sonar etc. Complete with batteries and full instructions.

Code: 290-131

£145.00



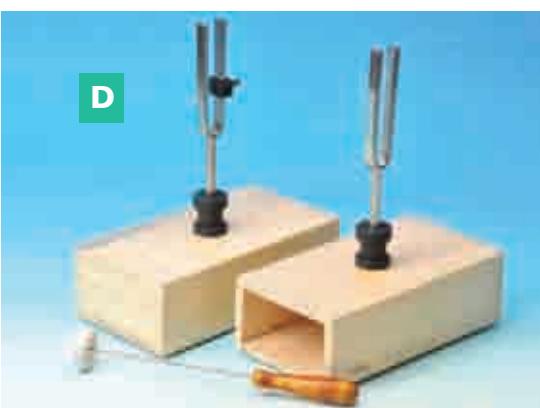
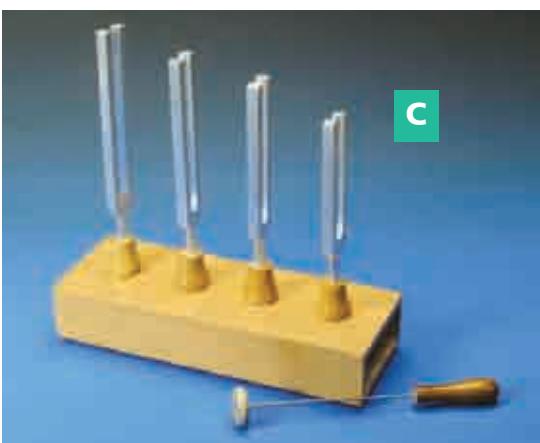
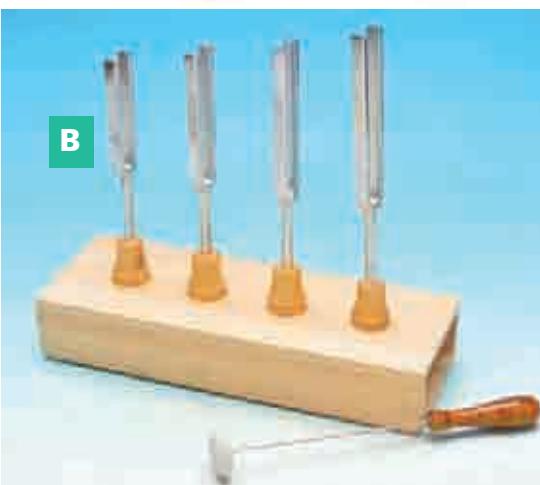
F Doppler Ball

A 90mm hollow plastic ball with a PP3 battery powered tone generator and speaker inside. The ball can be whirled round in a large horizontal circle by means of the attached cord to demonstrate the Doppler effect. Good output volume and variable pitch provide all that is required for a dramatic demonstration of the Doppler shift associated with a moving source.

Code: 50-360

£65.00





A Steel Tuning Forks

Best quality steel, plain shank, with frequency marked on each one. Boxed set of 8. Consists of one each of:

C (256); D (288); E (320); F (341); G (384); A (426); B (480); C (512).

Code: PH0738A - Set of 8

£49.00

B Steel Tuning Forks on Resonance Box

For demonstrating the formation of basic major chords. Consists of four forks mounted on a wooden box and having frequency of:

C (256); E (320); G (384); C (512).

Code: PH0740A - Set of 4

£49.00

C Aluminium Tuning Forks on Resonance Box

For demonstrating the formation of basic major chords. Consists of four forks mounted on a wooden box and having frequency of:

C (256); E (320); G (384); C (512).

Code: PH0740B - Set of 4

£69.00

D Steel Tuning Forks on Resonance Box

A pair of steel tuning forks for demonstrating the beat frequencies, mounted on individual boxes. One fork is provided with an adjustable mass by means of which frequency may be shifted from the nominal 426.6Hz. When both forks are sounded a clearly audible 'beat' is produced, its rate depending upon the difference in frequency between the forks.

Code: PH0742A - Pair

£29.00

E Aluminium Tuning Forks

High quality aluminium plain shank tuning forks with frequency in Hertz marked on each one. Boxed set of 8. Consists of one each of:

C (256); D (288); E (320); F (341); G (384); A (426); B (480); C (512).

Code: TNFRKIR8 - Set of 8 £29.00



F Adjustable Tuning Fork, 210mm

Aluminium tuning fork, adjustable to deliver 7 frequencies:

(C, D, E, F, G, A, B).

Code: 720-001 £19.00

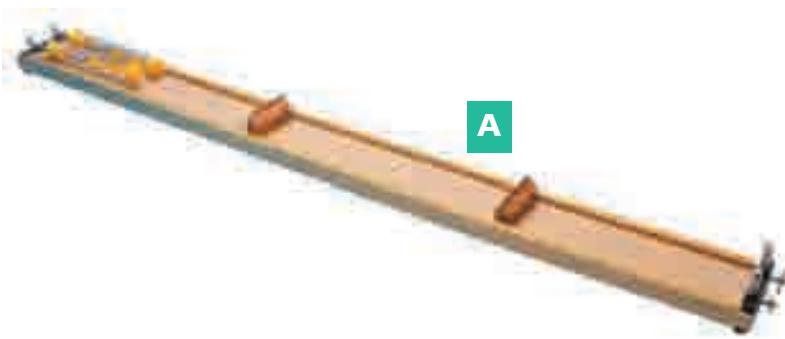


G Aluminium Tuning Forks

Manufactured from high quality aluminium with plain shanks. Frequency marked on each one.

Code: TNFRK1 - 256hz	£4.75
Code: TNFRK2 - 288hz	£4.75
Code: TNFRK3 - 320hz	£4.75
Code: TNFRK4 - 341hz	£4.75
Code: TNFRK5 - 384hz	£4.75
Code: TNFRK6 - 426hz	£4.75
Code: TNFRK7 - 480hz	£4.75
Code: TNFRK8 - 512hz	£4.75





A

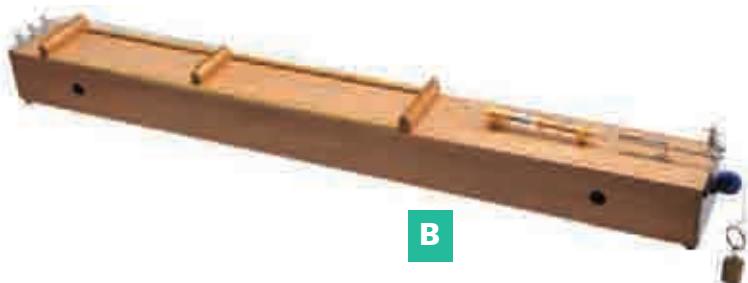
A

Sonometer

A wooden resonance box 1140mm long, 125mm wide and 100mm high. At one end of the base are two 50N spring balances with hooks and at the other end are two corresponding wrest pins. Also included are three bridges; one large (to span wires) and two small (for the individual wires). Supplied with two steel wires, 30 swg, 1 metre long.

Code: PH0726

£49.00



B

B

Sonometer, 3-Wire Pattern

A hollow, wooden, resonance box 1290 x 130 x 110mm, with scales divided in millimetres between fixed bridges over which the wires are stretched. A spring balance reading 100N x 5N is fitted to one end and the tension exerted and measured can be finely adjusted by a wing nut. Another wire passes over a pulley and can be loaded as desired.

Code: PH0730

£50.00



C

C

Kundt's Tube - Unmounted

Show the wavelength of vibrations in air in a closed tube by depositing lycopodium powder at the nodes. Comprising a glass tube approximately 80cm in length and 32mm in diameter. At one end is a tightly fitting but adjustable cork piston fitted to a metal rod 100cm long. At the other end a loose fitting piston attached to a sounding rod, 100cm in length and 8mm dia. Closed length: 1890mm.

Code: PH0722

£120.00



D



E

D

Resonance Apparatus, Brass Tubes

This apparatus is used for resonance investigations in air columns and consists of two metal tubes telescoping into each other. The column of air within the tubes may be altered in length from 300mm up to 530mm by moving the outer tube. Fitted on a removable wooden base.

Code: PH0718B

£35.00

E

Forced Oscillation & Resonance

Designed to show vibration of an object when repeated impulses are applied, this demonstrator consists of two weights of different natural frequencies, two cams driven by a 6V motor with speed control, and four springs. The speed control is used to adjust the frequency of applied force for resonance, so a greater degree of variance is possible. Includes manual. Size. 30 x15 x 45cm

Code: 241-520

£75.00

F

Vibration Generator with Accessories

Gives mechanical oscillations when fed by oscillator- AF amplifier. Frequency response for whole of audio spectrum and beyond. Frequency range 30 to 10,000Hz. Coil impedance: 30ohm. Amplitude Output: 4mm Maximum. Electrical Input: 5W. Weight: 1Kg. Dimensions: 100 x 100 x 90mm. Accessories included.

Code: 241-403

£85.00

F

G

Ripple Tank Kit

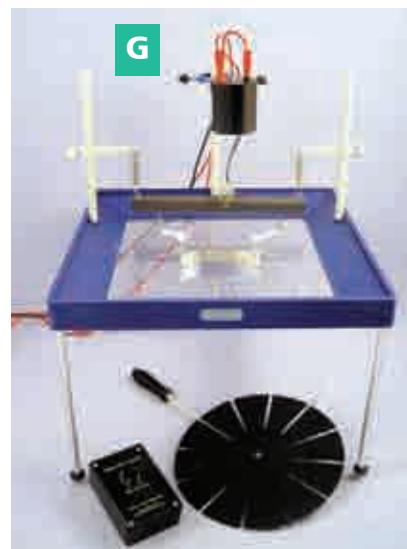
This economy Ripple Tank System comes as a ready-to-use unit with no external power source required. Comprised of a tough, moulded frame with a large transparent viewing surface. The Ripple Tank light source is a 6V halogen lamp which gives excellent illumination. The tank has sloping sides which minimise noise.

The Ripple Tank System comes complete with:

Ripple tank; 4 Push-fit legs; Ripple motor, eccentric cam mounted on ripple bar; 3 Support pillars for supporting the light source and rippler bar; 2 Motor support springs; Lamp unit with adjustable arm; 2 Rippler bar hanging hooks; Power source for ripple tank; Hand stroboscope; Concave perspex plate; Rectangular perspex plate; Curved reflector; 2 Barriers; Roller Bar.

Code: EDU044

£105.00


H

Ripple Tank

This excellent quality Ripple Tank provides a comprehensive demonstration of the general properties of waves. Wave Propagation Phenomena are projected onto a screen.

Topics to explore:

Reflection & Refraction - parallel waves can be produced and by using appropriate barriers reflection and refraction are produced.

Interference Phenomena - occurs when two point source dippers generate circular waves. These can be regulated. Plus many more experiments. Teacher's notes and experiments are provided in a superb manual. Requires a 12V, 5A DC Power supply. The Ripple Tank and accessories are all housed in a high quality, aluminium case

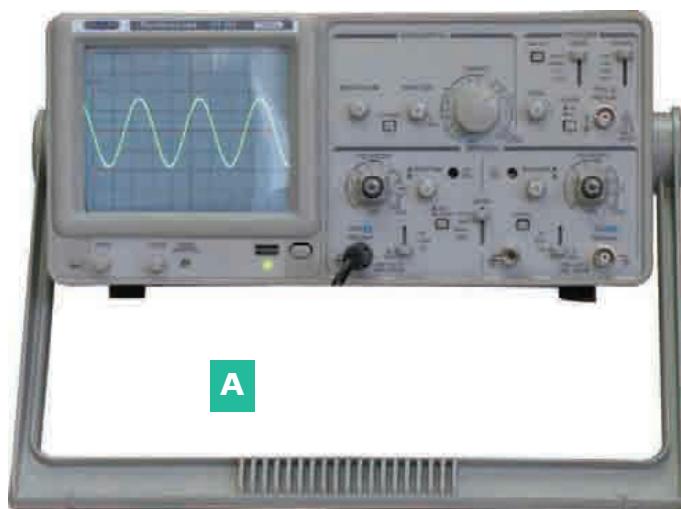
Kit consists of:

Variable Vibrato; Ripple Tank; Wave dampers; Electronic Stroboscope with halogen lamp; projection mirror; screen; wave dippers; and accessories.

Code: 241-400

£495.00





A

A

Oscilloscope

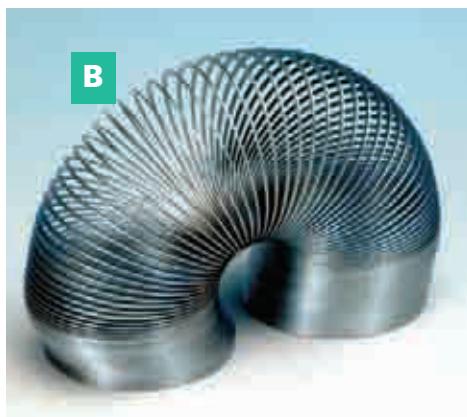
Features include:

20MHz Dual Channel; High Sensitivity 1mV/DIV; 5mV/DIV Sensitivity on Both Channels; CH1 & CH2 Independent Channels; CH1 Signal Output; Two waveforms in different frequency can be observed via alternative trigger function; High-speed sweep; Algebraic Addition and Subtraction; X-Y Operation; 0.2µs/div to 0.5s/div Time Base(Uncal up to 20ns); Z Modulation TTL Level; 8 x 10 cm Display Internal Graticule; TV signal synchronous function, TV Triggering Frame (V) & Line (H); Line Trigger, ALT Triggering.

Detailed technical data available on request.

Code: 241-511

£305.00



B

B

Slinky, Helical Springs

Metal slinky spring ideal for studying and demonstrating different types of waves.

Code: 241-501 - 150mm **£16.00**

Code: SPHL1000 - 100mm, 75mm dia. **£5.75**

Code: SPHL50 - 50mm, 75mm dia. **£3.15**



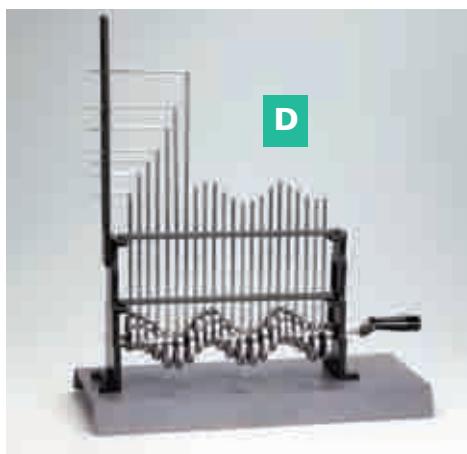
C

C

Helix Wave Form

Steel wire close-wound helix 20mm diameter. Closed length 3 metre extending to approx. 9 metre. Looped ends.

Code: PH0706 **£15.75**



D

D

Wave Motion Apparatus

For demonstrating the movement of progressive transverse waves.

Code: PH0712 **£59.00**

E Microwave Transmitter/Receiver

Apparatus for the investigation of transverse waves. Convenient wavelength for the investigation of transverse waves. Plane polarised wave for the transmitter, internally modulated with 1KHz tone, or music, or no modulation. Built in gain control for the receiver, with 30 bar graphs to indicate signal strength, external outputs to data-loggers and external meters. Built in loudspeaker for the receiver, with on /off control. Detail instruction booklet illustrating various microwave experiments, covering topics of wave reflection, refraction, polarization, interference etc. Auxiliary input for external simple tones to transmit through microwaves. Probe Detector for non-directional reception of the microwaves.

Code: 241-024 £475.00



E

F Microwave Accessory, Set of Plates

Comprising the following all on supporting feet:
 2 Aluminium plates, 200mm x280mm (approx.)
 1 Aluminium plate, 60mm x280mm (approx.)
 1 Perspex plate, 200mm x280mm (approx.)
 1 Polarization grille, 200mm x 200mm (approx.)

Code: 241-503 £85.00



F

G Microwave Accessory, Hollow Plano-convex Lens

Comprising a thin moulded plastic dome, 260mm dia., bonded to a 3mm thick plastic plate 315mm square. When in use the lens is filled with paraffin oil. Mounted in a vertical plane by channel base.

Code: 241-504 £85.00



G

H Microwave Accessory, Hollow Prism

Hollow prism made of perspex sheets to be filled with paraffin for microwave experiments. Can be filled with water for optics experiment. Height 21cm and longest side 30cm approximately.

Code: 241-505 £45.00



H

I Microwave Accessory, Rotating Protractor

For use in microwave experiments to measure the directivity of the microwave transmission.

Code: 241-506 £15.00



I

ATOMIC PHYSICS

A



A

Planck's Constant Apparatus

Functions as a ready-built circuit for the classic measurement of Planck's constant using the photoelectric effect. Ideal for use in conjunction with the Edu-Lab Picoammeter (614-008). Within the unit are a caesium antimony cathode (spectral response range: 185-650nm), a D/C power supply with a potentiometer to provide a variable retarding voltage to the photoelectric circuit and a digital display showing the retarding voltage, needed to reduce the current to zero (adjusted via the potentiometer). 6 Different coloured lenses are provided to vary the value of 'f' and a 4mm to UHF lead is included for connecting the picoammeter to the apparatus. (When using with the Edu-Lab Picoammeter, a UHF to UHF lead is required - please request this alternative lead when ordering).

Specification:

Dimensions: 205 x 150 x 115mm (W x H x D)
 DC Stopping potential controlled by 10-turn potentiometer
 DC voltmeter with 0-19.99V LED display
 Filters: 6 narrow-band (FWHM bandwidth: 4-15nm), with wavelengths of 405nm, 450nm, 510nm, 550nm, 590nm and 630nm
 Female UHF socket for connection to picoammeter
 Included input lead: UHF male to 2 x 4mm plugs (unless UHF to UHF is requested)
 Photocell: caesium antimony cathode, spectral response range: 185-650nm; Power source: 9V PP3 battery

Code: 261-008

£525.00



C



B

Planck's Constant Determination Box

This apparatus is designed to determine the approximate value of Planck's Constant using the elbow voltage in the characteristics curves of a number of LEDs. There are seven LEDs covering from deep blue at 470 nm to near IR 940 nm mounted on the box with sockets for voltage and current measurements. By monitoring the voltage at which each LED begins to emit light a graph of energy input as a function of light emitted frequency can be plotted and an approximate value of Planck's Constant can be deduced. External 9V power source or 9V battery and connecting leads required.

Code: 261-030

£79.00

C

Scaler-Timer

General purpose scaler-timer, suitable for radioactivity counting utilising a GM tube and as a general purpose millisecond digital timing device with manual or electronic triggering. 6-digit, bright green LED display. Manual or timed counting of 1,10 or 100 seconds. Press-to-read switch to read the accurate applied voltage to the GM tube. Auto ranging on timing modes. Built in loudspeaker and switch on the back of the machine allows audible indication of counts when required.

Specification:

Operation: Timer / Scaler; Capacity: 999,999 counts or seconds; Input power: 230V ±5%, 50Hz; Timing inputs: Manually switched start/stop; light gate(s) operated start/stop; GM tube Voltage: 300V to 500V; Fuse: 315mA (L) slow-blow Dimensions: 208 x 155 x 115mm (W x H x D). Height including handle is 187mm.

Code: 281-006

£375.00

D GM Tube Holder

Geiger-Müller Tube Holder, for use with Edu-Lab Scaler Timer (code: 281-006). An aluminum box 58 x 33mm (diameter x depth) which houses the G.M. tube socket. Connection is through a 1m long co-axial connecting lead, terminated in a standard P.E.T. connector. A 2.2MOhm stabilizing resistor is internally wired in series with the anode connection.

Code: 281-013

£130.00



E Geiger-Müller Tube

This is a halogen quenched metal tube with a thin end window, for detecting alpha, beta and gamma radiation and recommended as a general purpose tube for use with general school radioactive sources. A plastic cap is fitted over the vents for protection.

Features & Specifications:

Sensitive to alpha, beta and gamma radiation; Threshold voltage. (max.)370V; Plateau length (min.)100V; Operating temperature-55 to +74; Dead time 100 μ s; Anode /Cathode capacitance 3.5pF; Sensitivity for 1mR/L radium 1650 counts per minute; Window thickness 2.5 mg per square cm, Dimensions overall 76 x 26mm diameter.

Code: 261-007

£195.00



F Sealed Radioactive Source

Code: 261-025 - Strontium 90	£450.00
Code: 261-026 - Cobalt 60	£450.00
Code: 261-027 - Americium 241	£450.00

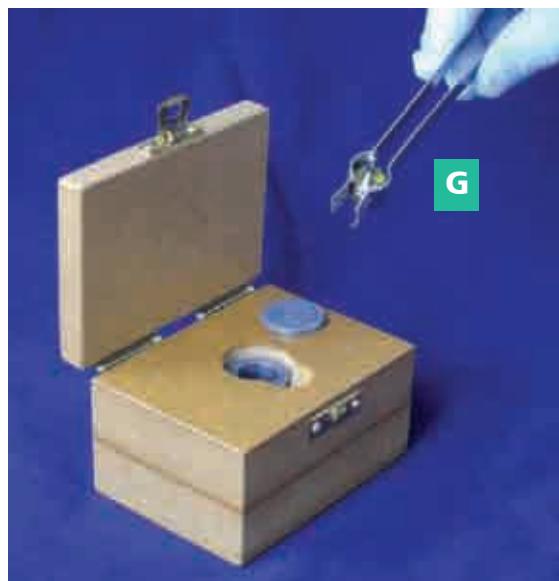


G Radioactive Source Handling Tongs

Specifically designed for handling radioactive sources, these tongs have shaped ends for gripping the source by the peg or the body. Length 165mm.

Code: 261-028

£12.95





A Protactinium Generator

Protactinium234 has a half-life of about 70 seconds, and is ideal for the observation of radioactive decay. The isotope is a product of the Uranium238 decay series. Supplied in a sealed container with leak-proof closure.

Code: 261-029

£269.00



B Half-Life Analogue

A container of 500, 10mm cubes is used to investigate the topic of half-life. Each cube has one face identified and the class is actively involved in 'throwing' the cubes, which represent atomic nuclei, to see how many 'decay' during each throw. Decayed nuclei are removed prior to the next throw. Very good results for an exponential decay curve are obtained without the hazards of using radioactive material and the investigation involves everyone rather than another teacher demonstration. Supplied with full instructions

Code: 920-102

£57.00



C Digital Meter with Shunts

This meter has two attachments included, 0-10 DC Amps and 0-20 DC Volts, so it can be used as an ammeter or as a voltmeter.

The basic unit has an input impedance of 100kohm. The resolution is 0.01 and accuracy is $\pm 2\%$. Supplied with a PP3 battery that gives a useful life of over 1000 hours. Ideal for use with Teltron Helmholtz coils.

Code: 261-031

£45.00

Teltron Discharge Tubes

The Teltron range of demonstration discharge tubes has been designed to show the properties of the free electron.

The D range is the original Teltron range with connections fixed on the tubes. The S range is a newer range with connections on the stand rather than the tubes.

Please note the ranges are not interchangeable.

Other equipment for use with the Teltron tubes:

605-006 EHT Power Supply
261-031 Digital Meter with two shunts included
231-080 Shrouded Test Lead Red
231-081 Shrouded Test Lead Black



D Teltron Tube Holder D

Holder for the complete range of Teltron D-series tubes and accessories. Cast light alloy stand has a wishbone, 360° rotating clamp made of heat-resistant plastic and two base holes for affixing the Teltron D Helmholtz Coils. Three rubber feet prevent slipping and provide maximum stability. 4mm earthing socket in pillar base.

Instructions included.

Dimensions: approx. 230x175x320 mm; Weight: approx. 1.5 kg.

Code: 261-009

£225.00

E Teltron Helmholtz Pair of Coils D

Pair of Helmholtz coils for generating a uniform magnetic field perpendicular to the axis of the Teltron D series tubes. Allows the coils to be configured in the Helmholtz geometry or to produce magnetic fields aligned vertically, or coaxial, with respect to the tube axis. The maximum field strength generated by the coils (~ 10 mT) is approximately 300 times weaker than that produced by an MRI machine (~ 3T), which are known to be safe for use by people with medical implants such as pacemakers.

Instructions included.

Specification:

Number of turns: 320; Max. continuous current: 1.0 A; Max. momentary current: 10 min @ 1.5 A; 3 min @ 2 A; Effective impedance: 6Ω; Max. field strength: approx. 10 mT; Connectors: 4-mm sockets.

Code: 261-010

£198.00



F Teltron Maltese Cross Tube D

High-vacuum electron tube with divergent electron gun aimed at a fluorescent screen partially obscured by a Maltese cross. For demonstrating the linear propagation of electrons in the absence of applied electromagnetic fields by projecting the shadow of a Maltese cross onto the fluorescent screen. Application of a magnetic field using the Helmholtz Coils allows for students to study the fundamental science of electron optics, such as beam focusing. Instructions included.

Specification:

Max. filament voltage: 6.3 V AC; Max. anode voltage: 5 kV; Anode current: approx. 0.1 mA at 4 kV.

Code: 261-011

£299.00





A

Teltron Electron Diffraction Tube D

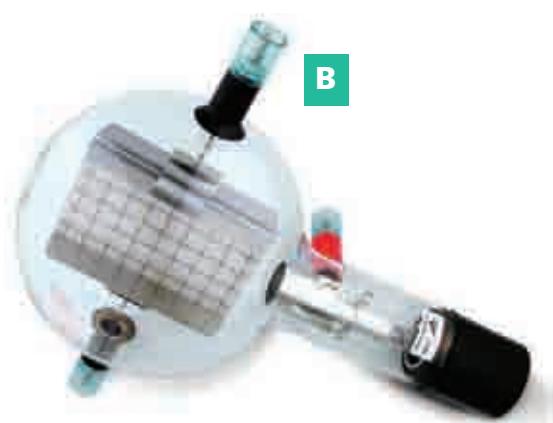
Highly evacuated electron tube for demonstrating the wave nature of electrons through the observation of interference caused by passage of electrons through polycrystalline graphite lattice (Debye-Scherrer diffraction) and rendered visible on a fluorescent screen. Also intended for determining the wavelength as a function of the anode voltage from the radii of the diffraction rings and the lattice plane spacing of graphite, as well as confirming de Broglie's hypothesis. Instructions included.

Specification:

Max. filament voltage: 6.3 V AC; Max. anode voltage: 5 kV; Anode current: approx. 0.1 mA at 4 kV; Lattice constant of graphite: $d_{10} = 0.213 \text{ nm}$; $d_{11} = 0.123 \text{ nm}$.

Code: 261-012

£467.00



B

Teltron Electron Deflection Tube D

Highly evacuated electron tube with focusing electron gun and fluorescent screen inclined relative to the beam axis, so that the path of the beam can be seen and the effects of electric and magnetic fields can be studied. The electron beam can be deflected electrically in the electric field of the built-in plate capacitor, and magnetically by using the Helmholtz coil pair D. By adjusting the electric field so that it cancels the magnetic deflection, it is possible to determine the specific charge e/m and the velocity of the electrons. Instructions included.

Specification:

Filament voltage: 6.3 V AC; Max. anode voltage: 5000 V; Anode current: approx. 0.1 mA at 4000 V; Max. capacitor voltage: 5000 V; Fluorescent screen: approx. 90x60 mm²; Glass bulb: approx. 130 mm dia.; Total length: approx. 260 mm.

Code: 261-013

£415.00

C



C

Teltron Dual Beam Tube D

Semi-evacuated electron tube filled with low-pressure helium and containing a tangential and axial electron gun. In the case of tangential bombardment and a perpendicularly aligned magnetic field, the fundamental electron charge-to-mass ratio can be determined from the diameter of the observed beam pattern. In the case of axial bombardment and a co-axial magnetic field, kinetic gas theory (e.g. impact excitation) and particle collisions can be studied through observations of the fine, luminescent beams resulting from excitation of the helium atoms. Instructions included.

Specification:

Max. filament voltage: 7.5 V; Max. anode voltage: 300 V DC; Anode current: approx. 30 mA at 200 V (anode); Max. deflection voltage: 50 V DC.

Code: 261-014

£465.00

D Teltron Perrin Tube D

Highly evacuated electron tube with focusing electron gun and fluorescent screen inclined relative to the beam axis so that the path of the beam can be seen and the effects of electric and magnetic fields can be studied. The electron beam can be deflected using two methods: 1) electrically using electric field of the built-in plate capacitor, or 2) magnetically using external Helmholtz Coils D. Also determine the fundamental electron charge-to-mass ratio (e/m) and study mean electron velocities using field cancellation.

Specification:

Max. filament voltage: 6.3 V AC; Max. anode voltage: 5 kV; Max. capacitor voltage: 500 V; Anode current: approx. 0.1 mA at 4 kV (anode).

Code: 261-016

£330.00



D

E Teltron Diode D

Pair of Helmholtz coils for generating a uniform magnetic field perpendicular to the axis of the Teltron D series tubes. Teltron Tube Holder D allows the coils to be configured in the Helmholtz geometry or to produce magnetic fields aligned vertically, or coaxial, with respect to the tube axis. The maximum field strength generated by the coils (~ 10 mT) is approximately 300 times weaker than that produced by an MRI machine (~ 3T), which are known to be safe for use by people with medical implants such as pacemakers.

Specification:

Number of turns: 320
Max. continuous current: 1.0 A
Max. momentary current: 10 min @ 1.5 A; 3 min @ 2 A
Effective impedance: 6 Ω
Max. field strength: approx. 10 mT
Connectors: 4-mm sockets

Code: 261-015

£239.00



E

F Teltron Tube Holder S

This holder is the mounting point for the entire line of Teltron Student ('S') Series and related accessories, such as the Helmholtz Coils S and Auxiliary Coil. An easily replaceable fuse is located in the holder to protect the valuable tubes from excessive voltage. The slots for holding coils have metric rulings to ensure precise adjustments with a maximum spacing of 150 mm. The Auxiliary Coil can be inserted into the stepped front side of the tube holder.

Features:

Five pin socket is concealed inside the tube holder
Cathode protection switch integrated into the tube holder
Protects heated cathode from excessive voltage
Base plate features slot for attaching the Teltron Helmholtz Coils S.

Specification:

Terminals : 4 mm safety sockets; 282mm x 231mm x 180mm.

Code: 261-017

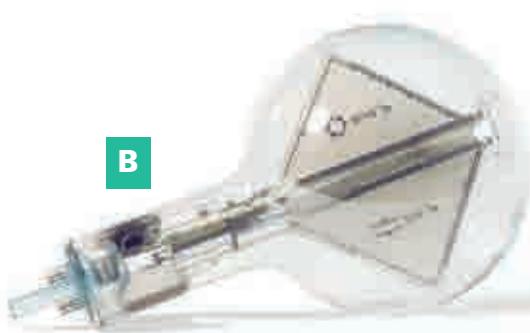
£199.00



F



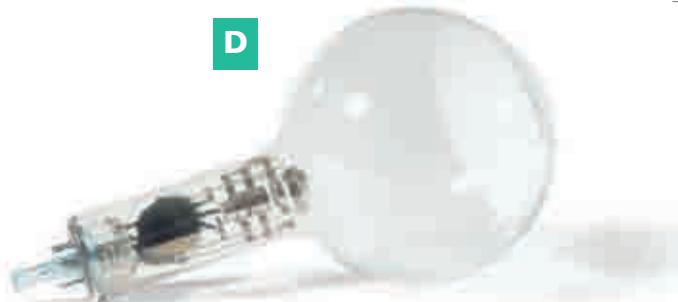
A



B



C



D

A

Teltron Helmholtz Coils S

Pair of Helmholtz coils for generating a uniform magnetic field perpendicular to the axis of the Teltron S series tube. Teltron Tube Holder S allows the coils to be configured in the Helmholtz geometry or at variable distances to produce magnetic fields aligned vertically, or coaxial, with respect to the tube axis. The maximum field strength generated by the coils (~ 10 mT) is approximately 300 times weaker than that produced by an MRI machine (~ 3T), known to be safe for use by people with medical implants such as pacemakers. Instructions included.

Specification (each): Number of turns: 320; Coil diameter: 138 mm; Load rating: 1.0 A (Continuous operation); 1.5 A (Short-term operation); Effective Impedance: approx. 6.5ohm; Terminals: 4 mm safety sockets; Max. field strength: approx. 9 mT.

Code: 261-018

£178.00

B

Teltron Thomson Tube S

High-vacuum electron tube with high-accuracy electron gun and ruled target phosphorescent screen. Determine the fundamental electron charge-to-mass ratio (e/m), study mean electron velocities using field cancellation, and explore electron optics using this tube. The electron beam trajectory can be manipulated using two methods: 1) deflection induced by the electric field of the built-in plate capacitor, or 2) magnetically using external Helmholtz Coils S. Instructions included.

Specification: Max. filament voltage: 6.3 V AC; Max. anode voltage: 5 kV; Max. capacitor voltage: 500 V; Anode current: approx. 0.1 mA at 4 kV (anode).

Code: 261-019

£405.00

C

Teltron Maltese Cross Tube S

High-vacuum electron tube with divergent electron gun aimed at a fluorescent screen partially obscured by a Maltese cross. For demonstrating the linear propagation of electrons in the absence of applied electromagnetic fields by projecting the shadow of a Maltese cross onto the fluorescent screen. Application of a magnetic field using the Helmholtz Coils S allows for students to study the fundamental science of electron optics, such as beam focusing. Instructions included.

Specification: Max. filament voltage: 6.3 V AC; Max. anode voltage: 5 kV; Anode current: approx. 0.1 mA at 4 kV.

Code: 261-020

£291.00

D

Teltron Electron Diffraction Tube S

Highly evacuated electron tube for demonstrating the wave nature of electrons through the observation of interference caused by passage of electrons through a polycrystalline graphite lattice (Debye-Scherrer diffraction) and rendered visible on a fluorescent screen. Also intended for determining the wavelength as a function of the anode voltage from the radii of the diffraction rings and the lattice plane spacing of graphite, as well as confirming de Broglie's hypothesis. Instructions included.

Specification: Max. filament voltage: 6.3 V AC; Max. anode voltage: 5 kV; Anode current: approx. 0.1 mA at 4 kV; Lattice constant of graphite: d10 = 0.213 nm; d11 = 0.123 nm.

Code: 261-021

£429.00

E Teltron Dual Beam Tube S

Semi-evacuated electron tube filled with low-pressure helium and containing a tangential and axial electron gun. In the case of tangential bombardment and a perpendicularly aligned magnetic field, the fundamental electron charge-to-mass ratio can be determined from the diameter of the observed beam pattern. In the case of axial bombardment and a co-axial magnetic field, kinetic gas theory (e.g. impact excitation) and particle collisions can be studied through observations of the fine, luminescent beams resulting from excitation of the helium atoms. Instructions included

Specification:

Max. filament voltage: 7.5 V; Max. anode voltage: 300 V DC;
Anode current: approx. 30 mA at 200 V (anode);
Max. deflection voltage: 50 V DC.

Code: 261-022

£415.00



F Teltron Diode S

High-vacuum electron tube with thermionic cathode for demonstrating the thermoelectric effect (Edison effect). Use the tube to investigate the relationship between measured emission current and the voltage applied to the cathode. Also investigate the characteristics of diodes via the process of rectification. Instructions included.

Specification:

Max. heater voltage: 7.5 V AC/DC; Max. anode voltage: 500 V;
Anode current: approx. 2 mA at 200 V (Anode).

Code: 261-023

£226.00



G Teltron Perrin Tube S

Highly evacuated electron tube with focusing electron gun and fluorescent screen inclined relative to the beam axis so that the path of the beam can be seen and the effects of electric and magnetic fields can be studied. The electron beam can be deflected using two methods: 1) electrically using electric field of the built-in plate capacitor, or 2) magnetically using external Helmholtz Coils S. Also determine the fundamental electron charge-to-mass ratio (e/m) and study mean electron velocities using field cancellation. Instructions included.

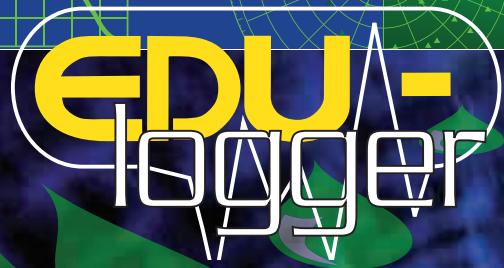
Specification (each):

Max. filament voltage: 6.3 V AC; Max. anode voltage: 5 kV;
Max. capacitor voltage: 500 V; Anode current: approx. 0.1 mA
at 4 kV (anode).

Code: 261-024

£325.00





The 'easiest to use' data-logging system
...guaranteed!



The data-logging system with a 20 second set-up time

The Edu-logger® is not just another data logging system; it is a completely different way of logging data. Instead of the traditional method of using a data logger and sensors, the Edu-Logger® sensors ARE the loggers!

Each sensor has a built in datalogger and memory chip. This offers numerous benefits and virtually eliminates set-up time! **You can literally be up and running in 20 seconds!**

There are **4 ways to log data** with Edu-logger®:

- Connected to a PC via a USB Cable
- WIRELESSLY via RF modules
- Remotely via a hand held monitor unit
- Remotely with just a battery pack

Additional benefits include:

- **Free software** (Download from our website or request on a CD. No licence fees - ever!)
- **Extensive software formulae function enables detailed analysis of experimental data**
- **Connect up to 40 sensors in a "daisy chain" via connector cables**
- **Extensive FREE resource library including worksheets and a 200 page user guide**

PLUS - Cost saving 'Starter Packs', specific to a science discipline or key stage application (see page 412)

Simple to use - can be used from primary right through to Further education and beyond

...the simplicity you want, the accuracy you need™



Sensor Logger + USB Module = Up and running!

Our sensor range is now so extensive that we have arranged them in Alphabetical order throughout the following pages...



Did you know?

EDU-LOGGER® technology is based on autonomous modular sensors that can be combined in a long "chain". Each sensor samples and records the information in its own memory, working independently from all of the other sensors.

EDU-LOGGER® sensors can be connected in any order to a PC or to a monitor display unit. The unique design of the sensors allows for any combination of modules, regardless of the connection order. Sensors can be added or removed without affecting the rest of the chain.

Once the EDU-LOGGER® sensors are connected in a manner appropriate for the experiment, they can be operated in three different modes:

PC: The sensors can be connected via a USB port or RF Module and the researcher can control data acquisition and analyze results using the EDU-LOGGER® software.

Monitor Display Unit: The unit comes equipped with an LCD screen and keyboard and can be used easily outdoors.

Independent Sensor: Each sensor contains its own memory and processor. It can be programmed via the PC or the monitor display unit and will then carry out measurements as a stand-alone unit.

Features:

- ▶ Flexible modular system.
- ▶ All sensors operate individually or in combination.
- ▶ Fast and easy connection to a USB port.
- ▶ Automatic recognition of sensors.
- ▶ Digital range definable via the included software.
- ▶ Programmable sample rate (1 /Hr to 10,000 /s).
- ▶ Extensive memory (64,000 samples /sensor).
- ▶ Variable duration of samples (0.025 sec to 31 days).
- ▶ Powered via USB or batteries. No mains required.

Customer's comments

"All other data logging systems on the market have pros and cons but I can't see any cons with the Edu-Logger® - it's so flexible and incredibly easy to use"

Antony, Head of Science

"We love it! So simple and yet can do so much."

Angela, Senior Science Technician

"The best data logging system I've used!"

Mike, Head of Science

"So quick to set up and easy to use."

Anthony, Head of Chemistry

"Very easy to use!"

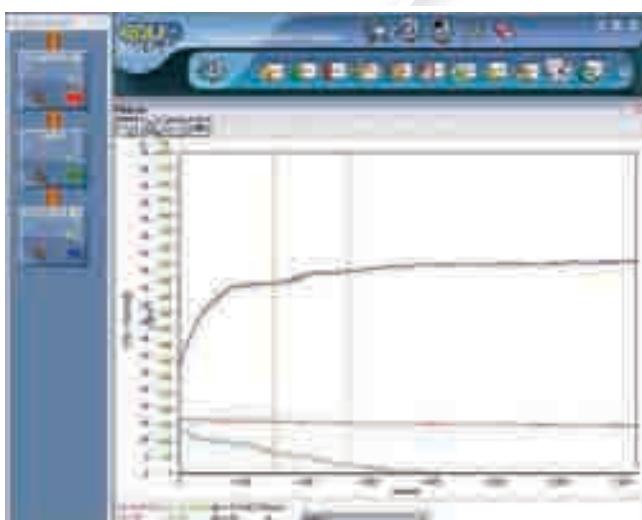
Chris, Head of Biology

"We actually use it - unlike all the others in the past which were so complicated that they sat in the cupboard!"

Muriel, Senior Science Technician

"Really good system - so simple."

Fabio, Science Technician



The Edu-Logger Software.
Quick, easy and best of all...
it's **FREE!**

A



B



C



D



E



F



Description	Code	Range(s)	Resolution	Experiment Duration	Price
A Acceleration	900-137	-80 a 80 m/s ² (all 3 axis) 80-106 kPa	0.15 m/s ² 0.1 kPa	25 Milliseconds - 31 days	£135.00
B Barometer	900-131	0.80-1.00 Atm 23.60-31.30 in/Hg -380-1950 m 0-250 mm/Hg	0.01 Atm 0.01 in/Hg 0.1 m 0.01mm/Hg	1 Second - 31 days	£99.00
C Blood pressure	900-132	0-250 Arb 0-250 mm/Hg + Arb	0.1 Arb 0.01 A+mm/Hg	1 Second - 31 days	£145.00
D Carbon Dioxide	900-130	350 to 10,000 ppm	1 ppm	1 Second - 31 days	£245.00
E Colorimeter	900-129	R.G.B. 0 to 4 absorbance	0.01% 0.01 abs	1 Second - 31 days	£145.00
F Conductivity	900-125	0 to 20000 μ s/cm 0 to 18000 mg/L 0 to 18000 ppm	0-2000 μ s/cm - 0.1 μ s/cm Over 2000 - 1 μ s/cm 0-1000 mg/L - 0.1 mg/L Over 1000 - 1 mg/L 0-1000 ppm - 0.1 ppm Over 1000 - 1 ppm	50 Milliseconds - 31 days	£115.00



A



B



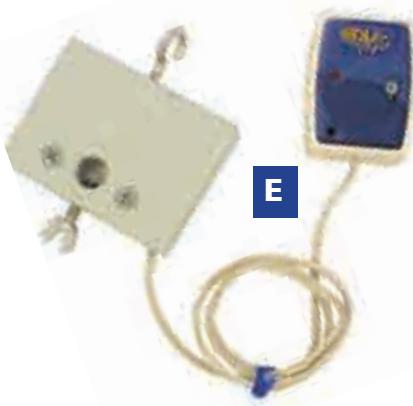
C



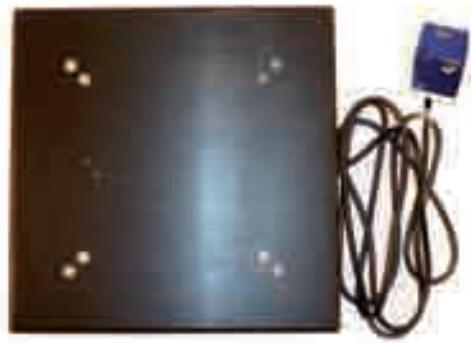
D



E



F



Datalogging

Description	Code	Range(s)	Resolution	Accuracy	Experiment Duration	Price
A Current	900-102	$\pm 2500\text{mA}$	10 mA	1%	50 Milliseconds - 31 days	£49.00
B Drop counter	900-133	0 to 25,000 counts 0 to 100mL			1 Second - 31 days	£139.00
Dynamometer - Hand 900-147 COMING SOON - prices and specification currently unavailable						
C EKG (ECG)	900-128	0-3mV				£175.00
D Flow rate	900-134	0 to 4.7 m/s	0.0001m/s		1 Second - 31 days	£165.00
E Force	900-111	$\pm 10\text{ N}$ $\pm 50\text{ N}$	0.01N 0.01N	Calibration Function	50 Milliseconds - 31 days	£150.00
F Force plate	900-135	-800 to +3500 N	0.3N		1 Second - 31 days	£245.00

G**H****I****J****K****L**

Description	Code	Range(s)	Resolution	Accuracy	Experiment Duration	Price
G Galvanic Skin Response (GSR)	900-127	0-65279 Arbitrary units 0-10 μ s	1 ARB 10nS	0.0001	1 Second - 31 days	£115.00
H Heart Rate and Pulse	900-108	BPM Arbitrary Units	2 BPM 1 ARB	1	1 Second - 31 days	£99.00
I Humidity - Relative	900-107	0 to 95% RH	0.1% RH	$\pm 5\%$ RH	1 Second - 31 days	£69.00
J Infrared Thermometer	900-145	-30°C to 382°C -22°F to 719 °F	0.1°C 0.1°F		50 Milliseconds - 31 days	£195.00
K Light Gate	900-109	Acceleration Velocity Time Momentum	0.01m/s ² 0.01m/s 0.001 seconds 0.0001 Kg m/s		25 Milliseconds to 31 days	£59.00
L Light	900-104	Illumination: 0 to 1,000 lx Illumination: 0 to 6,000 lx Illumination: 0 to 150,000 lx Signal: 0 to 1,000 lx Signal: 0 to 6,000 lx Signal: 0 to 150,000 lx	1 lx 6 lx 150 lx 1 lx 6 lx 150 lx	1 lx 6 lx 150 lx 1 lx 6 lx 150 lx	25 Milliseconds to 31 days	£65.00



A



B



C



D



E



F



Datalogging

Description	Code	Range(s)	Resolution	Accuracy	Experiment Duration	Price
A Magnetic Field	900-124	±10 milli Tesla (mT) Distance 0.25 to 6M	0.001mT 0.02M (2mm)		25 Milliseconds to 31 days	£69.00
B Motion	900-123	Velocity ± 10 m/s Acceleration ± 100 m/s ²	m/s 0.01m/s ²		1 Second - 31 days	£125.00
C Oxygen	900-105	0 to 25% (air) 0 to 100% (dissolved) 0 to 12.5 mg/L	0.1% 0.1% 0.1mg/L	Calibration Function	1 Second - 31 days	£245.00
D pH	900-106	0 to 14 pH	0.1 pH	Calibration Function	1 Second - 31 days	£115.00
E Pressure	900-110	0 to 7 atm 0 to 100 p.s.i. 0 to 700 kPa 0 to 7 bar	0.01 atm 0.1 p.s.i. 0.1 kPa 0.01 bar	± 1% (20 - 30 °C)	1 Second - 31 days	£99.00
Respiration	900-146	COMING SOON - prices and specification currently unavailable				
F Rotary motion	900-136	0° to 360° ± 345 Rad/s ± 32,222 Rad/s ²	0.08° 0.6 Rad/s 11 Rad/s ²	Calibration Function	1 Second - 31 days	£175.00



EDU-logger®



Description	Code	Range(s)	Resolution	Accuracy	Experiment Duration	Price
G Salinity	900-138	0 to 7% 0 to 60,000 mg/L 0 to 60,000 ppm	0.01% 0-1000 mg/L - 0.1 mg/L Over 1000 - 1 mg/L 0-1000 ppm - 0.1 ppm Over 1000 - 1 ppm		1 Second - 31 days	£115.00
H Soil moisture	900-139	0 to 50 cBar 0 to 50 KPascal	0.02 cBar 0.02 KPascal		1 Second - 31 days	£115.00
I Sound	900-112	40 to 110 dB Signal: 0-1024	0.1 dB 1	± 2 dB 1	25 Milliseconds to 31 days	£49.00
J Spirometer	900-126	± 10 L/s	0.05 L/s		1 Second - 31 days	£115.00
K Temperature	900-103	-35 to 150°C -31 to 238°F	0.1°C 0.2°F	± 1% °C ± 2% °F	1 Second - 31 days	£49.00

Datalogging

409

Datalogging

410



Description	Code	Range(s)	Resolution	Accuracy	Experiment Duration	Price
A Temperature - Surface	900-143	-35 to 150°C -31 to 238°F	0.1°C 0.1°F		1 Second - 31 days	£35.00
B Temperature - Wide Range	900-144	-200°C to 1200°C -320°F to 2200°F	0.1°C 0.1°F		1 Second - 31 days	£79.00
C Turbidity	900-141	0-200 NTU	0.08NTU		1 Second - 31 days	£145.00
D UVA	900-142	0-50,000 mW/m ²	74 mW/m ²		1 Second - 31 days	£125.00
E UVB	900-140	0-1500 mW/m ²	0.8 mW/m ²		1 Second - 31 days	£139.00
F Voltage	900-101	±20V	0.01V	1%	50 Milliseconds - 31 days	£49.00



Name	Code	Description/Purpose	Price
G Battery Module	900-115	Powers logger sensors when not connected to PC or Monitor Display Unit. Utilises 4 x AA Batteries (included).	£39.00
H Case for Datalogger Kit	900-117	Padded carry case to keep your sensors safe and organized.	£45.00
I Monitor Display Unit (MDU)	900-114	Enables programming of logger-sensors without the use of PC, together with digital display of sensors' data. Internal rechargeable battery (charger supplied)	£145.00
J RF module	900-116	Enables wireless connection of logger-sensors to PC and MDU	£39.00
K USB Connector cable - 100cm	900-119	Connects logger-sensors to USB Module and other logger-sensors ("Daisy - chaining")	£5.00
K USB Connector cable - 30cm	900-118	Connects logger-sensors to USB Module and other logger-sensors ("Daisy - chaining")	£5.00
L USB Module	900-113	Connects logger-sensors to PC (please add in other text from original proof as well)	£45.00



Starter Packs

We have carefully selected sensors that are appropriate to the different sciences/Key Stages and bundled them into "starter" packs offering good discounts over individual sensor prices.

A Datalogger Kit with Case

A comprehensive range of the most commonly used sensors in a handy carry case.

Contents:

- 1 x 900-101 - Voltage Logger Sensor
- 1 x 900-102 - Current Logger Sensor
- 1 x 900-103 - Temperature Logger Sensor
- 1 x 900-104 - Light Logger Sensor
- 1 x 900-105 - Oxygen Logger Sensor
- 1 x 900-106 - pH Logger Sensor
- 1 x 900-107 - Humidity Logger Sensor
- 1 x 900-108 - Heart Rate and Pulse Logger Sensor
- 1 x 900-109 - Light Gate Logger Sensor
- 1 x 900-110 - Pressure Logger Sensor
- 1 x 900-111 - Force Logger Sensor
- 1 x 900-112 - Sound Logger Sensor
- 1 x 900-113 - USB Bridge Module
- 1 x 900-114 - Monitor Display Unit
- 1 x 900-115 - Battery Module
- 2 x 900-116 - RF Modules
- 1 x 900-117 - Carry-case for Datalogger Kit
- 4 x 900-118 - 30cm USB Cables
- 4 x 900-119 - 100cm USB Cables

Code: 900-100

£1,300.00

SAVE £195.00

B Biology Starter Pack

Included in this kit:

Code	Edu-logger®	Qty
900-114	Monitor Display Unit	1
900-103	Temperature Logger Sensor	1
900-108	Heart Rate and Pulse Logger Sensor	1
900-110	Pressure Logger Sensor	1
900-130	CO2 Logger Sensor	1
900-113	USB Module	1
900-115	Battery Module	1
900-117	Case for Datalogger Kit	1
900-118	USB Lead - 30cm	3
900-119	USB Lead - 100cm	1

Code: 900-148

£695.00

SAVE £87.00

C Chemistry Starter Pack

Included in this kit:

Code	Edu-logger®	Qty
900-114	Monitor Display Unit	1
900-103	Temperature Logger Sensor	2
900-106	pH Logger Sensor	1
900-110	Pressure Logger Sensor	1
900-101	Voltage Logger Sensor	1
900-113	USB Module	1
900-115	Battery Module	1
900-117	Case for Datalogger Kit	1
900-118	USB Lead - 30cm	4
900-119	USB Lead - 100cm	1

Code: 900-149

£590.00

SAVE £66.00

D Physics Starter Pack

Included in this kit:

Code	Edu-logger®	Qty
900-114	Monitor Display Unit	x1
900-123	Motion Logger Sensor	x1
900-111	Force Logger Sensor	x1
900-112	Sound Logger Sensor	x1
900-101	Voltage Logger Sensor	x1
900-113	USB Bridge	x1
900-115	Battery Module	x1
900-117	Case for Datalogger Kit	x1
900-118	USB Lead - 30cm	x3
900-119	USB Lead - 100cm	x1

Code: 900-150

£595.00

SAVE £68.00

E Earth Science Starter Pack

Included in this kit:

Code	Edu-logger®	Qty
900-114	Monitor Display Unit	1
900-103	Temperature Logger Sensor	2
900-104	Light Logger Sensor	1
900-106	pH Logger Sensor	1
900-140	UVB Logger Sensor	1
900-113	USB Module	1
900-115	Battery Module	1
900-117	Case for Datalogger Kit	1
900-118	USB Lead - 30cm	4
900-119	USB Lead - 100cm	1

Code: 900-151

£640.00

SAVE £72.00



H

F Environmental Science Starter Pack

Included in this kit:

Code	Edu-logger®	Qty
900-114	Monitor Display Unit	1
900-103	Temperature Logger Sensor	1
900-106	pH Logger Sensor	1
900-125	Conductivity Logger Sensor	1
900-105	Oxygen Logger Sensor	1
900-139	Soil moisture Logger Sensor	1
900-141	Turbidity Logger Sensor	1
900-113	USB Module	1
900-115	Battery Module	1
900-117	Case for Datalogger Kit	1
900-118	USB Lead - 30cm	5
900-119	USB Lead - 100cm	1

Code: 900-152

£950.00

SAVE £134.00

G KS2 Starter Pack

Included in this kit:

Code	Edu-logger®	Qty
900-114	Monitor Display Unit	1
900-103	Temperature Logger Sensor	2
900-104	Light Logger Sensor	1
900-123	Motion Logger Sensor	1
900-113	USB Module	1
900-115	Battery Module	1
900-117	Case for Datalogger Kit	1
900-118	USB Lead - 30cm	2
900-119	USB Lead - 100cm	1

Code: 900-153

£450.00

SAVE £123.00

H

KS3 Starter Pack

Included in this kit:

Code	Edu-logger®	Qty
900-114	Monitor Display Unit	1
900-123	Motion Logger Sensor	1
900-106	pH Logger Sensor	1
900-101	Voltage Logger Sensor	1
900-103	Temperature Logger Sensor	2
900-104	Light Logger Sensor	1
900-113	USB Module	1
900-115	Battery Module	1
900-117	Case for Datalogger Kit	1
900-118	USB Lead - 30cm	5
900-119	USB Lead - 100cm	1

Code: 900-154

£650.00

SAVE £102.00

In addition to the packs featured here, we offer tailor-made sensor packs with great discounts - call us to discuss your requirements.

$$\phi = \sqrt{\sum_{n=1}^{\infty} (x-y^2)}$$

$$S = \int_{10}^{10} \sum_{n=1}^{\infty} (x-m)^2$$

NUMERACY +maths



$$f(x) = \frac{\sin(a)}{1-\tan^2(a)} + v^2 = Z$$

Numeracy & Maths

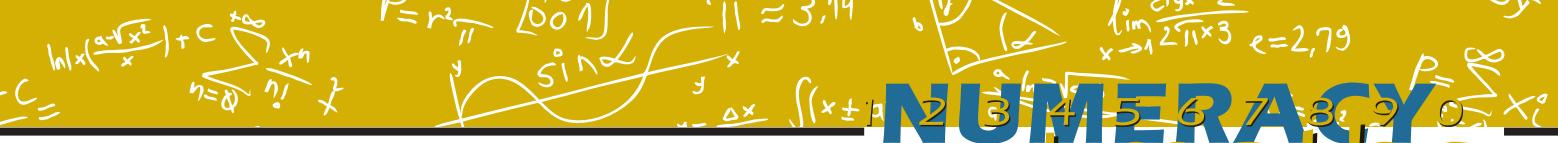
CONTENTS

Clever Catch®

Maths Skills Games

Maths Charts





NUMERACY + maths

NUMERACY

About the Clever Catch® range:

These colourful 600mm inflatable vinyl balls provide an excellent way for children to build maths skills.

The Maths Clever Catch® balls feature various problems, facts and illustrations to reinforce that maths can be fun!

Play involves two or more players tossing the ball to each other and answering the question found on the ball under their left thumb. Directions and answers are included.



A Clever Catch® - Probability & Statistics

Statistics have never been this fun! Includes 87 challenging questions with a complete answer sheet.

Code: SR-1467

£9.50



B Clever Catch® - Trigonometry

Trigonometry is a subject that all students need extra review with. Sides and angles of planes or spherical triangles and the calculation based on them, are covered in the questions.

Code: SR-1568

£9.50



C Clever Catch® - Algebra

The **NEW** Algebra 1 Clever Catch® encourages students to solve algebraic equations quickly and easily while having fun. The 83 color coded questions include Properties, Simplifying Equations, Basic Functions, Inequalities and Absolute Value. Clever Catch® Algebra helps build an excellent foundation for comprehension of algebra.

Code: SR-1382

£9.50



D Clever Catch® - Blank

This is a very adaptable teaching aid. You make the questions and design the ball as needed for whatever topics your students need help with most. Use a wet erase marker to write the problems or questions. We recommend not using a Blue wet erase marker as it may leave a stain on the ball. Suitable for all ages.

Code: SR-1468ND

£9.50



MORE...

Clever Catch Balls, covering other educational subjects are available on many pages throughout the catalogue.

Numeracy

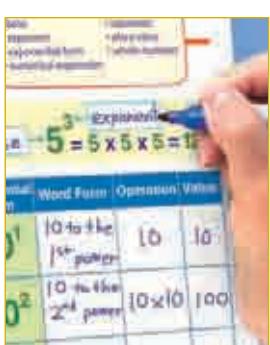
415

$$\phi = \sqrt{\sum_{n=1}^{\infty} (x-y)^2} \quad f = \sqrt{\sum_{n=1}^{\infty} (x-m)^2} \quad \sum_{n=1}^{\infty} = h_{n-1}$$

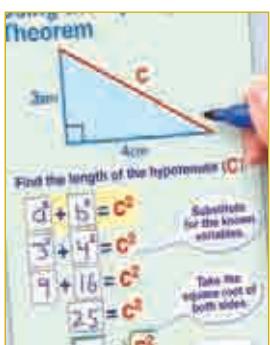
$$S = \begin{bmatrix} 10 & 0 \\ 0 & 1 \end{bmatrix} \quad h = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$\tan(a) = \frac{\sin(a)}{1 - \tan^2(a)} \quad \frac{\Delta x}{\Delta y} = \lim_{n \rightarrow \infty} \frac{\Delta x + z}{\Delta y}$$

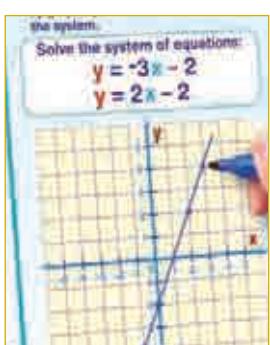
MATHS - Key Stage 3



A



B



C

About the Maths Flipchart range:

10 set series presents levelled review of Grades 1 - 8 (ages 5-14years) maths standards.

Each Curriculum Mastery Flip Chart Set features:

- ▶ 10 Double-sided, laminated charts.
- ▶ Full-sized, 30 x 45cm charts.
- ▶ Activity Guide featuring black-line copy-masters of the charts along with review questions, vocabulary terms, suggested activities and more.
- ▶ Sturdy easel for years of classroom application.
- ▶ Side 1 features a colourful, graphic overview of the topic.
- ▶ Side 2 serves as a 'write-on/wipe-off' activity chart featuring questions, labeling exercises, vocabulary review & more!

A Grade 6 Maths Flipchart Set

Commutative & Associative Properties; Decimal Operations; Graphing Ordered Pairs; Integers & Rational Numbers; Adding & Subtracting Integers; Multiplying & Dividing Integers; Writing Expressions; Solving Equations; Area of Triangles; Area & Circumference of Circles.

Code: 101-131

£30.00

B Grade 7 Maths Flipchart Set

Analyzing & Displaying Data; Equations & Inequalities; Exponents, Factors & Fractions; Geometric Proportions; Finding Volume; Applying Percents; Lines & Angles; The Pythagorean Theorem; Introduction to Functions; Nonlinear Functions & Set Theory.

Code: 101-132

£30.00

C Grade 8 Maths Flipchart Set

Integer Operations; Rational Numbers & Operations; Real Numbers; Numbers & Percents; Polynomials & Exponents; Patterns in Geometry; 3-D Geometry; Solving Linear Equations; Ratios, Proportions & Percent; and Mathematical Processes.

Code: 101-133

£30.00

About the Maths Skills Games range:

Comprehensive coverage of the Current NCTM Standards for Grades 1 - 8 (ages 5 - 14years)

Each set features:

- 25 Sets of 30 standards-based review cards - a total of 750 review cards.
- Each set is focused on a specific curriculum topic and levelled by content & readability.
- 12 Double-sided, laminated game boards.
- Comprehensive Teacher Planning & Resource Guide
- Presentation CD featuring interactive review questions for use on a PC, Mac or projection unit.
- Free introductory online subscription to access interactive content, activities and assessments.



D



D Grade 6 Maths Skills Game

Whole Numbers to Trillions; Commutative/Associative Properties; Distributive Property; Proportions/Equivalent Fractions; Percents; Ordering Fractions; Add/Subtract Fractions; Multiply/Divide Fractions; Mixed Numbers; Rational Numbers; Percent, Rate, Base; Order of Operations; Repeated Multiplication; Exponents; Evaluate Exponents; One & Two Step Functions; Evaluate Formulas; Simple Proportions; Area of Triangles & Quadrilaterals; Area and Circumference of Circles; Plotting Points; Area of Coordinate Polygons; Measurement Conversion; Statistics; Graphs.

Code: 101-150

£99.00

E Grade 7 Maths Skills Game

Organizing Data; Analyzing, Graphing & Displaying Data; Introduction to Algebra; Equations & Inequalities; Using Integers; Rational & Irrational Numbers; Decimal Operations; Exponents, Factors & Fractions; Fraction Operations; Numerical Proportions; Geometric Proportions; Introduction to Percent; Applying Percents; Plane Figures: Lines & Angles; Plane Figures: Closed Figure Relationships; Measurement, Perimeter & Circumference; Exploring Area & Surface Area; The Pythagorean Theorem; Finding Volume; Introduction to Probability; Using Probability; Algebraic Equations; Algebraic Inequalities; Introduction to Functions; Nonlinear Functions & Set Theory.

Code: 101-151

£99.00



E

F Grade 8 Maths Skills Game

Equations & Inequalities; Using Graphs to Analyze Data; Integer Operations; Polynomials & Exponents; Rational Numbers & Operations; Real Numbers; Collecting & Describing Data; Displaying Data; Plane Figures; Patterns in Geometry; Perimeter & Area; Three Dimensional Geometry /Measurement; Ratios, Proportions & Percents; Similarity & Scale; Numbers & Percents; Applications of Percent; Experimental Probability; Theoretical Probability & Counting; Solving Linear Equations; Solving Equations & Inequalities; Linear Equations; Linear Relationships; Sequences; Functions; and Mathematical Processes.

Code: 101-152

£99.00



F

Maths

Labware

CONTENTS

- General Labware (in alphabetical order)
- Safety
- Storage



LABWARE A-Z

A Absorption Tube

Heavy walled borosilicate glass, U-form.

Code: ABS125 - 125x15mm, Pack of 2 £3.95

Code: ABS150 - 150x20mm, Pack of 2 £4.95



B Absorption Tube with Connectors

Heavy walled borosilicate glass, U-form, with connector tubes of approximately 6mm diameter.

Code: AST125 - 125x15mm, Pack of 2 £6.25

Code: AST150 - 150x20mm, Pack of 2 £6.25



C Aspirator 5L PE With Tap

High density polythene. Graduated in litres. Integrally moulded spout, threaded to accept replaceable polypropylene tap. Complete with handle and leakproof polythene cap.

Code: 700-005 £10.00



D Classic Media Autoclaves

The Prestige Medical Classic Media autoclave offers a safe method of sterilising media in the school laboratory. With an interlock lid for safety, it ensures the unit cannot be opened until the temperature inside has fallen to a safer level, preventing vessels/glassware exploding or liquid leaking. With a one-touch button operation you can set and forget, with no supervision necessary. This model has been specifically designed to provide the most suitable working conditions (temperature, pressure and cycle time) for sterilising media and is ideal for educational use. Capacity: 9 & 12 Litres.

Code: 261-044 - Standard, 9 Litres £999.00

Code: 261-045 - Extended, 12 Litres £1,199.00

**A****14 litre Aluminium Gas Autoclave**

Suitable for instruments, glassware, media and waste.

Internal dimensions: 280 x 230mm (dia. x depth)

Minimal maintenance

Can be heated using a domestic or bottled gas flame

Maximum Working Temperature: 121°C

Design Pressure: 1.3 bar

No plumbing required

Code: 612-006**£905.00****B****14 litre Aluminium Autoclave**

Suitable for instruments, glassware, media and waste.
Electrically powered with thermostat.

Internal dimensions: 280 x 230mm (dia. x depth)

Minimal maintenance

Maximum Working Temperature: 121°C

Design Pressure: 1.3 bar

Electrically safe to BS3456

Electrical power 220 - 240 volt, 2.0k.

No plumbing required

Code: 612-004**£1,345.00****C****14 litre Aluminium Vario Autoclave**

Suitable for instruments, glassware, media and waste.
Electrically powered with thermostat. The VARIO remote control unit gives variable cycle temperatures and times, four preset cycles, stores cycles in memory and has many more useful features.

Internal dimensions: 280 x 230mm (dia. x depth)

Minimal maintenance

Maximum Working Temperature: 121°C

Design Pressure: 1.3 bar

Electrically safe to BS3456

Electrical power 220 - 240 volt, 2.0kW.

No plumbing required

Code: 612-005**£1,965.00**

D Autoclave Bags

High temperature autoclave bags, manufactured from heavy-gauge polypropylene, suitable for autoclaving up to a temperature of 136°C. Clear with blue biohazard labelling and a write-on panel for further labelling.

Code: 700-002 - 310x660mm, Pack of 200 £29.50

Code: 700-003 - 400x700mm, Pack of 200 £36.50

Code: 700-004 - 600x780mm, Pack of 200 £69.40



D

E Autoclave Tape

Reel: 50m x 25mm.

Code: 700-001 £6.85



E

F Lever Arm Balances

A direct reading, single pan balance with its scale in the form of a quadrant. The arc scale is graduated in dual ranges of 0-250 x 1g and 0-1000 x 5g (dual range only) which can be set using the weight arm provided. Cast aluminium frame with all steel parts chrome plated. Levelling screw for zero adjustment.

Code: P15 - Single £23.00

Code: P16 - Dual £40.00



F

G Single Pan Balance, Triple Beam

This single pan, triple beam balance (with 200g capacity uncalibrated tare beam) has been specially designed to handle weighing solids and powder. The balance has three notched and tiered beams with centre readings and sliding indicator masses. The three beams are calibrated 500 x 100g, 100 x 10g and 10 x 0.1g - providing sensitivity of 0.1g up to a total of 610g. The capacity can be increased up to 2,610g by using supplementary masses. Spring loaded zero adjust compensator and magnetic damping are provided for fast setting and reading.

Code: CH0024A £115.00



G



A

A

Dune Compact Balances

The Dune series offers all of the necessary features for quick and easy weighing. Every Dune is equipped with an AC adapter, auto calibration through the keypad, low battery indicator and overload indicator. With its alternate battery operation, splash-proof keypad, and sturdy plastic construction throughout, the Dune delivers accurate readings in field, classroom, workplace or lab, a truly versatile and portable product. Platform size 145 x 145mm. Weighing units g and oz.

Code: 602-040 - 200 x 0.1g	£44.00
Code: 602-041 - 2000 x 1g	£44.00
Code: 602-042 - 5000 x 2g	£44.00



B

B

Core Compact Portable Balances

Specification:

- Stainless steel pan
- Auto power off
- Low battery indication
- ShockProtect® overload three-point protection
- Can be stacked for storage
- Lock down mounting slot for Kensington® type lock and cable
- Dual tare keys, colour-coded for easy recognition
- Removable draught shield
- Below balance weighing, with hanger
- Backlit LCD display
- Mains adapter supplied as standard
- (please specify 110/230V while ordering)

Code: 602-043 - 200g x 0.01g	£168.00
Code: 602-044 - 250g x 0.1g	£99.00
Code: 602-045 - 600g x 0.1g	£115.00
Code: 602-046 - 1500g x 0.1g	£140.00
Code: 602-047 - 2600g x 0.1g	£175.00
Code: 602-048 - 2000g x 1g	£84.00
Code: 602-049 - 5000g x 1g	£99.00

C OHAUS CL Compact Balances

The OHAUS CL Compact Scale is lightweight and portable. Applications can include quality control, formulation, soil sampling, jewellery, postal weighing and dietary weighing. Easy operation with 2 clearly marked buttons, low battery indicator and auto shut-off feature to conserve battery life. Mechanical and software overload protection to protect weighing cell from damage.

Specification:

Weighing Units: g, lb:oz, ozt, dwt
 Zero Range: To capacity by subtraction
 Stabilization Time: 3 seconds
 Optimum Operating Temperature: 18°-25°C
 Power Requirements: 3 x AA alkaline batteries (included) or AC adapter (optional)
 Calibration: User calibration from keypad
 Display: LCD (12mm high digits)
 Pan size: (mm) 120
 Scale Dimensions WxHxD (mm) 140 x 40 x 200
 Net Weight (g) 400

Code: 602-093 - 200 x 0.1g	£35.00
Code: 602-094 - 2000 x 1g	£29.00
Code: 602-095 - 5000 x 1g	£33.00



C

Standard Features:

Superior RF Protection - Superior RF protection to deliver accurate and stable results when used in production areas or near cell phones. Approvals for electrical and emissions include CE listed and FCC Class B Part 15 operation.
Large Stainless Steel Weighing Platform - A large weighing platform that can adequately handle large samples.
Stackable Design with Integrated Shipping Lock - Low profile stackable design to make storage easy. The integrated lock protects the weighing cell from damage during storage or transportation.

D OHAUS Traveler® Portable Balances

Designed for basic but accurate weighing in educational applications, the OHAUS Traveler™ Series was designed with a unique draughtshield that offers weigh-thru capability while being used and 'stackability' when being stored. With the right combination of performance and features, the Traveler™ is great value for your basic weighing applications.

Specification:

Weighing Units: Gram, Newton
 Tare Range: To capacity by subtraction
 Linearity: ± 1 d
 Stabilization Time (sec): < 3
 Display Size W x H (mm): 84 x 17
 Operating Temperature Range: 50° - 104°F / 10° - 40°C
 Power Requirements: AC Adapter (included) or 4 AA Batteries (not included)
 Dimensions WxHxD (mm): 149 x 73 x 224 (to top of shield)
 Operating Humidity Range: 30%-90%

Code: 602-017 - 150g x 0.01g	£175.00
Code: 602-018 - 300g x 0.01g	£190.00
Code: 602-019 - 300g x 0.1g	£105.00
Code: 602-020 - 500g x 0.1g	£120.00
Code: 602-021 - 1500g x 0.1g	£169.00
Code: 602-022 - 3000g x 0.1g	£189.00
Code: 602-023 - 5000g x 1g	£115.00



D

Standard Features:

Weigh-Thru Draughtshield - Unique draughtshield designed with an easy to remove centre section that provides protection from rough environments while maintaining weighing speed.
Stackable Draughtshield - Designed with storage in mind it allows the balances to be stacked away when not in use. The draughtshield's centre piece can also be removed and converts into a weigh boat when turned upside down!
USB or RS232 Connectivity - Easy-to-install interface options, which provide weight output to an OHAUS printer or PC.

**A****Standard Features:**

- Easy to Use** - High-contrast LCD display combined with two key operation makes the ScoutPro easy to operate.
- USB or RS232 Connectivity** - Quickly-installed option with integral cable allows data connection to PC or printer.
- Easy to Clean** - Removable stainless steel weighing platform, sealed front panel and moulded spill ring.
- Battery or AC Power** - Uses 4 AA batteries with auto shut-off feature for 40 hours of operation, or the Scout Pro can be run on the included AC adapter.
- Multiple Weighing Units** - grams, kilograms, pounds, ounces, combined pound/ounce display, troy ounces and pennyweights.
- Integral Weigh-Below Hook** - Critical for density or specific gravity determination.

Multiple Application Modes:

- Parts Counting** - For counting parts for inventory control, parts bagging, receiving, dispensing and ticket counting.
- Percentage Weighing** - Compare samples for compounding, formulation or quick weight checking.
- Totalisation** - Use the memory function to repeatedly sum the weight on the platform for compounding and formulation.
- Display Hold** - Allows you to retain the weight of an over-sized package on the display.
- User-Configurable** - Allows you to select active weighing units and modes using the two-button keypad. Can be quickly configured using an on-display menu system. A built-in lock switch prevents reconfiguration during use.

A**OHAUS Scout® Pro Balances**

The Ohaus Scout Pro is designed for use in laboratory, industrial or education applications and continues the tradition set by the Ohaus Scout and Scout II balances. Featuring easy-to-use two-button operation, a high-contrast LCD display, multiple weighing units, four application modes and the option of either RS232 or USB connectivity. Scout Pro balances are available with an auxiliary LCD for demonstration purposes (codes: 602-067 to 602-076).

Specification:

Tare Range: To Capacity By Subtraction
 Over Range Capacity: Capacity +90d
 Stabilization Time: 3 seconds
 Operating Temp. Range: 10° to 40°C
 Power Requirements: AC Adapter or 4 AA Batteries (not included)
 Display: High Contrast LCD with 6 digits 15mm high
 Calibration Type: Digital Calibration from Keypad
 Shipping Dimensions (mm) W x H x D: 254 x 102 x 305
 Shipping Weight (kg): 1.8

Code: 602-004	£375.00
- 120g x 0.001g, Pan - 90mm dia.	
Code: 602-005	£199.00
- 200g x 0.01g, Pan - 120mm dia.	
Code: 602-006	£239.00
- 400g x 0.01g, Pan - 120mm dia.	
Code: 602-007	£145.00
- 400g x 0.1g, Pan - 120mm dia.	
Code: 602-008	£149.00
- 600g x 0.1g, Pan - 165x142mm	
Code: 602-009	£215.00
- 2000g x 0.1g, Pan - 165x142mm	
Code: 602-010	£289.00
- 4000g x 0.1g, Pan - 165x142mm	
Code: 602-011	£160.00
- 6000g x 1g, Pan - 165x142mm	

**B****B****PGW Precision Balances**

Designed to meet the needs of Laboratories, Schools, Industry and Commercial users.

Specification:

Metal casing; Security locking point; External calibration; Below-balance weighing; Full-range tare; Platform size: 192 x 192mm; 18+ Weighing units (including one custom unit); RS-232 bi-directional interface

Code: 602-024 - 1500g x 0.01g	£515.00
Code: 602-025 - 2500g x 0.01g	£545.00
Code: 602-026 - 3500g x 0.01g	£570.00
Code: 602-027 - 4500g x 0.01g	£585.00

C Highland Portable Precision Balances

Features and Specifications:

RS232 and USB Interface both included
 Can be stacked for storage
 ShockProtect™ overload three-point protection
 Handical™ manual internal calibration with built-in mass
 Lock down mounting slot for Kensington™ type lock
 Dual tare keys, color-coded for easy recognition
 Capacity tracker
 Removable draught shield
 Stainless steel pan
 Auto power off
 Low battery indication
 Rechargeable battery / mains adapter supplied as standard
 Below balance weighing with hanger
 Backlit LCD display
 Percentage & accumulation weighing
 Parts counting
 Platform size: 120mm Ø.
 Units of measurement:
 g, ct, lb, d, GN, Ozt, dWt, MM, TL.T, TL.S, TL.T, N.

Code: 602-059 - 120 x 0.001g	£288.00
Code: 602-060 - 150 x 0.005g	£240.00
Code: 602-061 - 300 x 0.01g	£240.00
Code: 602-062 - 600 x 0.02g	£240.00
Code: 602-063 - 600 x 0.01g	£273.00
Code: 602-064 - 1500 x 0.05g	£240.00
Code: 602-065 - 1000 x 0.01g	£295.00
Code: 602-066 - 3000 x 0.1g	£240.00


C

D Navigator® LED Portable Balances

The Navigator® series offers a unique combination of features, including touchless sensors, ultra-fast response time and superior overload protection for use in a wide variety of weighing applications.

Specification:

Tare Range: To Capacity By Subtraction
 Stabilization Time: 1 second
 Operating Temp. Range: 10° to 40°C
 Operating Humidity Range: 20% to 85%
 Power Requirements: 12VDC 0.42A AC adapter (included), 100-240V 0.25A 50-60Hz
 Display: 20 mm digits LED 6-digit 7-segment
 Calibration Type: User-selectable external span or linearity calibration / Digital with external weight
 Checkweigh Indicators: Over-Accept-Under LED annunciations
 Keypad: 4 mechanical keys, raised and with tactile feedback plus 2 touchless

Code: 602-089 - 210g x 0.01g	£239.00
Code: 602-090 - 510g x 0.1g	£155.00
Code: 602-091 - 1100g x 0.1g	£175.00
Code: 602-092 - 2100g x 0.1g	£199.00


D

Standard Features:

Touchless Sensors – Two touchless sensors that free up your hands so you can focus on handling samples. The touch-free control of the zero, print, function or tare operations avoids transferring sample residue to the keypad. Sensors can be set independently to control up to 36 combinations of operations.

One Second Stabilization Time – Stabilizes in less than a second to provide fast and accurate weighing results.

Superior Overload Protection – Allows the scale to withstand loads up to 400% of its rated capacity. An integrated shipping lock further protects the weighing cell from damage during transportation or storage.



A



B



A

OHAUS Pioneer Balances

Analytical balance. Draughtshield with removable panels.

Platform sizes: 90mm dia. or *120mm dia. or **180mm dia
Weighing units: mg, g, ct, oz, dwt, tical, tola, mommes, baht,
grain, mesghal, Newton, ozt, teals, custom.

Code: 602-037 - 65g x 0.1mg	£699.00
Code: 602-077 - 110g x 0.1mg	£825.00
Code: 602-078 - 210g x 0.1mg	£950.00
Code: 602-079 - 210g x 1mg *	£525.00
Code: 602-080 - 410g x 1mg, *	£530.00
Code: 602-081 - 510g x 0.01g, **	£475.00
Code: 602-082 - 2100g x 0.01g, **	£575.00
Code: 602-083 - 4100g x 0.01g, **	£575.00
Code: 602-084 - 4100g x 0.1g, **	£525.00

B

Weighing Mass Sets

Polished brass weights in hardwood case with hinged lid and divided compartments. Nickel-silver and aluminium fractions.

Code: PH0034A - 1mg to 100g	£33.00
Code: PH0034B - 1mg to 200g	£52.00
Code: PH0034C - 1mg to 500g	£60.00
Code: PH0034D - 1mg to 1000g	£75.00
Code: PH0034E - 1mg to 2000g	£142.00

C

Weighing Boats

Diamond shaped. White.

Code: 723-001 - 5ml, Pack of 1000	£36.00
Code: 723-002 - 30ml, Pack of 500	£28.00
Code: 723-003 - 100ml, Pack of 250	£46.00

D Porcelain Evaporating Basins

Porcelain evaporating basin with spout, round bottom, glazed inside and outside except underside of base.

Code: 716-001 - 40ml, Each	£2.00
Code: EVAP80 - 80ml, Pack of 20	£30.00
Code: C72G - 100ml, Pack of 20	£32.00



E Glass Evaporating Basins

Glass evaporating basin with spout & round bottom.

Code: ED0503 - 100ml, Pack of 10	£32.00
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F Glass Beakers

Borosilicate glass, low form with spout. Graduated by 50ml increments. These beakers are equivalent to leading brands in quality, durability and heat resistance.

Code: BK0104 - 50ml	£0.95
Code: BK0105 - 100ml	£0.85
Code: BK0107 - 250ml	£1.00
Code: BK0108 - 400ml	£1.25
Code: BK0110 - 600ml	£1.75
Code: BK0112 - 1000ml	£3.15



G Tripour Beakers

Beaker with three pouring spouts, made of ultra clear polypropylene with moulded-in graduations. Autoclavable up to 121 °C.

Code: 702-011 - 50ml	£0.55
Code: 702-007 - 100ml	£0.65
Code: 702-009 - 250ml	£0.70
Code: 702-010 - 400ml	£0.75
Code: 702-012 - 900ml	£1.30



**A****A**

Polypropylene Beakers

A range of polypropylene beakers having excellent clarity and very good chemical resistance. The products are autoclavable up to 130°C, have raised graduations on the outer surface and an excellent easy-pour tapered spout.

Code: BEAK0050 - 50ml, Pack of 10 £7.25

Code: BEAK0100 - 100ml, Pack of 10 £7.50

Code: BEAK0250 - 250ml, Pack of 10 £8.00

Code: BEAK0500 - 500ml, Pack of 5 £8.50

Code: BEAK1000 - 1000ml, Pack of 5 £10.50

Code: BEAK2000 - 2000ml, Pack of 5 £24.00

Polypropylene Beaker Sets:

Code: EDU915 - Set of 5 £8.50

(10, 25, 50, 100 & 250ml)

Code: 704-012 - Set of 8 £22.00

(10, 25, 50, 100, 250, 500, 1000 & 2000ml)

Code: EDU1203 - Set of 4 £9.50

(50, 100, 250 & 500ml)

Code: EDU881 - Set of 5 £10.50

(50, 100, 250, 500 & 1000ml)

Code: TBEAK - Set of 10 £12.75

(5 x 100ml & 5 x 250ml)

Code: EDU906 - Set of 3 £8.50

(500, 1000 & 2000ml)

**B****B**

TPX Beakers

Crystal clear autoclavable, graduated beaker. The beaker is made from clear TPX for easy volume reading.

Code: 704-041 - 50ml x 5ml £2.50

Code: 704-042 - 100ml x 5ml £2.95

Code: 704-043 - 250ml x 10ml £4.95

Code: 704-044 - 500ml x 10ml £6.50

Code: 704-045 - 1000ml x 20ml £9.25

Code: 704-046 - 2000ml x 50ml £29.00

C Reagent Bottles

Borosilicate glass, narrow mouth with acid proof polypropylene stopper.

Code: 704-021 - 30ml	£2.75
Code: 704-022 - 60ml	£2.95
Code: 704-023 - 125ml	£3.95
Code: 704-024 - 250ml	£7.00
Code: 704-025 - 500ml	£7.50
Code: 704-026 - 1000ml	£8.00



D Amber Glass Reagent Bottles

Narrow mouth, amber glass with interchangeable dust-proof plastic stopper.

Code: 704-032 - 50ml	£3.25
Code: 704-029 - 100ml	£3.50
Code: 704-031 - 250ml	£7.25
Code: 704-033 - 500ml	£8.00
Code: 704-030 - 1000ml	£9.00



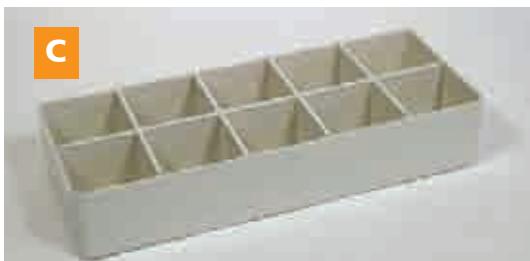
E Specimen Bottles

Polypropylene with screw cap. 30ml volume, wide mouth with lid design that is easy to seal or remove.

Code: EDU651 - Pack of 10	£9.00
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A

B

C

D
A

Dropping Bottles

Low Density Polyethylene Dropping Bottles dispense small uniform drops of liquids when pressed lightly.

Code: 704-027 - 60ml £0.50

Code: 704-028 - 125ml £0.75

B

Glass Dropping Bottles

Borosilicate glass pipette dropping bottle with glass dropper, high density polythene stopper with dust-proof head and vinyl teat. Both stopper and teat are resistant to acids and alkalis.

Code: EDU677A - Clear, 30ml, Pack of 6 £14.70

Code: EDU677B - Clear, 60ml, Pack of 6 £15.75

Code: EDU679A - Clear, 125ml, Pack of 6 £19.00

Code: EDU680A - Amber, 30ml, Pack of 6 £16.00

Code: EDU681B - Amber, 60ml, Pack of 6 £22.00

Code: EDU682A - Amber, 125ml, Pack of 6 £29.40

C

Dropping Bottle Tray

Plastic tray with divider for dropper bottle storage. Holds 10 x 30ml dropper bottles. Removable divider. Size: 208 x 85 x 35mm (L x W x D)

Code: 704-0001 £10.00

D

Wash Bottles

Resilient, translucent polyethylene narrow-mouth wash bottles. Material thickness designed for easy handling when squeezing. The cap is fitted with a flexible polyethylene delivery tube with nozzle, which can be aimed wherever required, and the nozzle has a removable cap.

Code: CH0180A - 125ml, Pack of 5 £4.75

Code: CH0180B - 250ml, Pack of 5 £5.25

Code: CH0180C - 500ml, Pack of 5 £7.00

Code: CH0180D - 1000ml, Pack of 5 £8.50

E Beaker Brushes

Bristles on 40cm long wooden handle.
Head size: 65 x 45 x 150mm.

Code: CH0214A - Bristle, Pack of 10 £21.00
Code: CH0214B - Nylon, Pack of 10 £21.00

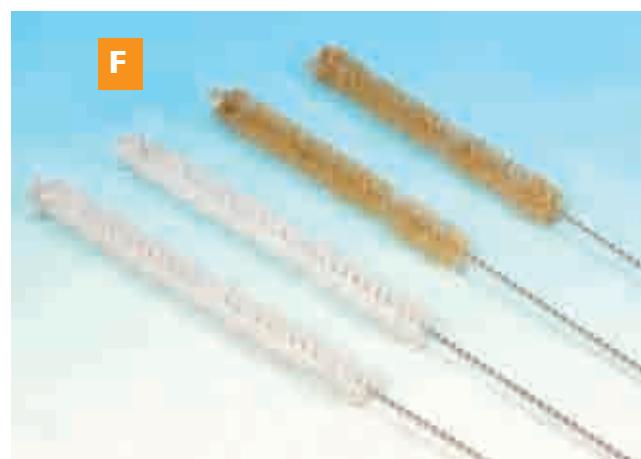


E

F Burette Brushes

Burette brush on galvanised steel wire handle.
High quality materials used for durability.

Code: CH0217A £10.50
- Bristle, 25ml Burette, 610 x 16mm, Pack of 10
Code: CH0217B £13.50
- Bristle, 50ml Burette, 760 x 19mm, Pack of 10
Code: CH0217C £17.00
- Bristle, 100ml Burette, 915 x 25mm, Pack of 10
Code: CH0217D £10.50
- Nylon, 25ml Burette, 610 x 16mm, Pack of 10
Code: CH0217E £13.50
- Nylon, 50ml Burette, 760 x 19mm, Pack of 10
Code: CH0217F £17.00
- Nylon, 100ml Burette, 915 x 25mm, Pack of 10



F

G Cylinder Brushes

Brush head widens towards the end, with a slightly fanned tip. On galvanised wire handle. Diameter 50-100mm. Suitable for Erlenmeyer flasks, cylinders and beakers.

Code: CH0220A - Bristle, Pack of 10 £21.00
Code: CH0220B - Nylon, Pack of 10 £21.00

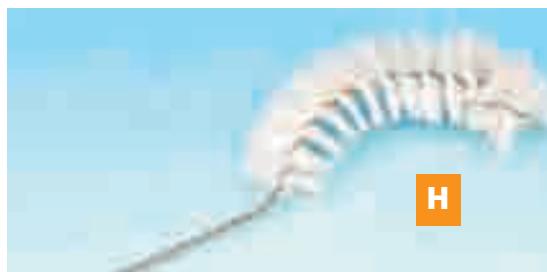


G

H Flask Brushes

For round bottom flasks up to 100mm dia. On galvanised wire handle. Overall length: 480mm.

Code: CH0216A - Bristle, Pack of 10 £25.00
Code: CH0216B - Nylon, Pack of 10 £25.00



H



A

A

Pipette Brushes

Pipette brush. Head size 125 x 10mm. Overall length 400mm. For pipettes and tubes from 8-12 mm diameter.

Code: CH0218A - Bristle, Pack of 10 £12.50

Code: CH0218B - Nylon, Pack of 10 £10.00



B

B

Test Tube Brushes

Test tube brush with fanned tip on galvanized steel wire handle.

Code: CH0204A £3.50

- Bristle, 11mm, Pack of 10

Code: CH0204B £5.50

- Bristle, 29mm, Pack of 10

Code: CH0204C £3.50

- Nylon, 11mm, Pack of 10

Code: CH0204D £5.50

- Nylon, 29mm, Pack of 10



C

C

Test Tube Brushes

Test tube brush, head size 50 x 19mm (L x D), on galvanised wire, overall length 230mm.

Code: CH0210A - Bristle, Pack of 10 £7.50

Code: CH0210B - Nylon, Pack of 10 £7.50



D

D

Tapered Test Tube Brushes

Test tube brush with fluffed cotton yarn tip on galvanised steel wire handle.

Code: CH0206A £8.50

- Bristle, Head 24-13mm, Pack of 10

Code: CH0206B £8.50

- Bristle, Head 35-25mm, Pack of 10

Code: CH0206C £8.50

- Nylon, Head 24-13mm, Pack of 10

Code: CH0206D £8.50

- Nylon, Head 35-25mm, Pack of 10

E Glass Stopcock Burettes

Class B Single Bore Burette with single straight bore. Interchangeable glass key stopcock with blue ceramic graduations. Accuracy $\pm 0.1\text{ml}$. Class B.

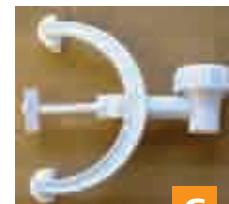
Code: 702-002 - 10ml x 0.1ml	£8.95
Code: 702-003 - 25ml x 0.1ml	£9.25
Code: 13234A - 50ml x 0.1ml	£9.95



F PTFE Stopcock Burettes

Burette with straight bore interchangeable PTFE key stopcock and blue ceramic graduations. Accuracy $\pm 0.1\text{ml}$. This unit requires no lubrication and is sealed with a simple nut and 'O' ring mechanism. Class B.

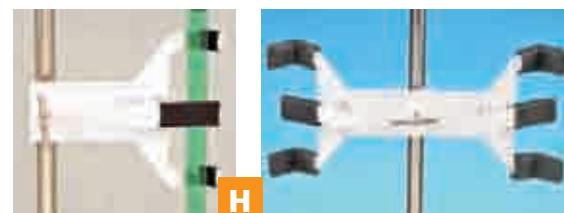
Code: 702-004 - 25ml x 0.1ml	£12.25
Code: 11780A - 50ml x 0.1ml	£12.95



G Polypropylene Burette Clamps

Fisher clamp for burette

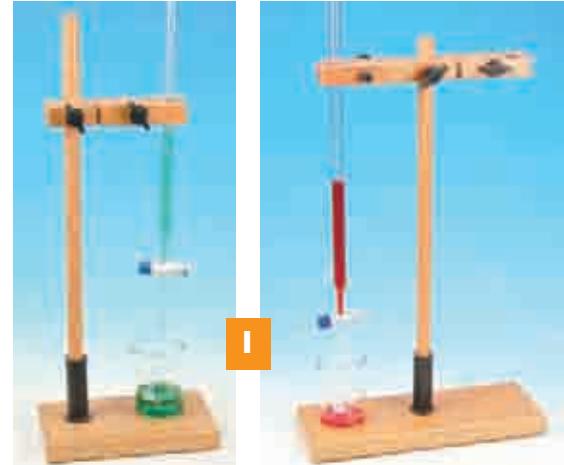
Code: CH0262A - Single	£15.50
Code: CH0262B - Double	£18.00



H Burette Clamps

Die-cast retort clamp with built-in boss head. Spring loaded jaws furnished with rubber grips for quick and stable clamping. High quality finish to metal surfaces.

Code: EDU732 - Single, Pack of 10	£84.00
Code: EDU733 - Double, Pack of 10	£160.00



I Hardwood Burette Stands

Seasoned hardwood, polished stand with clamp. Rods are approx. 460 x 16mm. Base: 100 x 200mm (*290mm)

Code: C264 - Single	£19.00
Code: C264B - Double*	£29.00



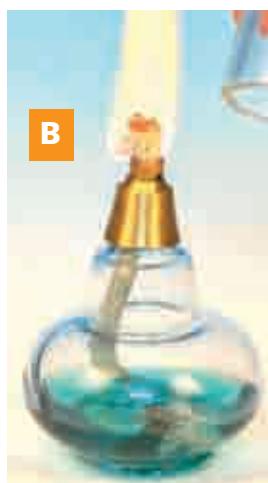
A

Spirit Lamp Burner

Stainless steel spirit lamp with woven wick in holder and screw-on cap.

Code: CH0535B £7.95

Code: 704-011 - Spare Wicks, Pack of 10 £5.25



B

B

Spirit Burner with Wick

Glass spirit lamp with metal wick holder and spare wick. Complete with plastic cap. 80ml capacity.

Code: C532 £3.50

Code: CH0352WK £6.80

- Spare wicks, Pack of 10



C

C

Bunsen Burner Tubing

High quality tubing for secure connection of bunsen burners to gas taps. Silicon rubber, with reinforced ends.

Code: 704-016 - 600mm, Pack of 10 £52.00

Code: 704-017 - 900mm, Pack of 10 £69.00



D

D

Semi Micro Natural Gas Burner

Suitable for natural gas with air regulator. Burner tube 100 x 5.5mm(HxD). Connector 9mm (OD).

Code: CH0099 £12.50

E LPG Bunsen Burners

Nickel-plated burner tube with rotatable air regulator, mounted on an enamelled pressed-steel base with a cylindrical rifled connector. Base dia. 80mm, 8mm inlet. Packed in a sturdy presentation case for storage and shipping. Conforms to safety standards.

Code: EDU1080 - 125 x 11mm (hxdia.) £8.95
Code: EDU101 - 145 x 13mm (hxdia.) £8.95



E

F Natural Gas Bunsen Burners

Nickel-plated burner tube with rotatable air regulator, mounted on an enamelled pressed-steel base with a cylindrical rifled connector. Base dia. 80mm, 8mm inlet. Packed in a sturdy presentation case for storage and shipping. Conforms to safety standards.

Code: EDU1081 - 125 x 11mm (hxdia.) £8.95
Code: EDU078 - 145 x 13mm (hxdia.) £8.95



F

G Teclu Natural Gas Bunsen Burner

Natural gas burner with conical mixing section, screwed air regulator and gas control needle. It gives a very hot flame suitable for glasswork and soldering. Burner tube 125 x 13mm (HxD). Base dia. 80mm, 9mm inlet.

Code: CH0096 - 13mm dia. £23.00



G



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Becelec 2 Electric Burner

The new Becelec 2 Electric Burner offers a unique replacement option to conventional gas bunsen burners. The high power heater combined with a reflective internal stainless steel bowl produces a concentrated stream of heat comparable with that of existing gas-powered bunsen burners. The wire safety guard included adds to the safety aspect of this burner.

Technical Specification:

Dimensions: 310 x 200 x 110mm (L x W xH)

Power: 500 watt.

Temperature range: 37 to 920° C

Weight: 1.7 Kg.

Diameter of heating area: 130mm.

Code: 612-014

£145.00

B

SpinGene Microcentrifuge

Personal Interchangeable Microcentrifuge. SpinGene is ideal for DNA extraction and concentration, quick spin downs, microfiltration and cell separation. SpinGene is ergonomically designed with interchangeable rotors, non-slip base and transparent cover.

SpinGene is designed to be:

Personal and affordable

Lightweight and compact

Quiet and quick to set up

Supplied with:

Two interchangeable rotors for 8 x 0.5ml & 1.5ml tubes or 16 x 0.2ml tubes (2 strips of 8)

Operation to 6500rpm providing 2000g RCF

230V AC, 50-60Hz

12 months warranty

Code: 15E481

£199.00

C

Targa Centrifuge with Swing Out Rotor

The Targa centrifuge is designed specifically for the education market being a low cost, low energy product. Constructed with a durable steel body for safety, with four-place swing out rotor and removable buckets.

Specification:

Maximum speed: 2800rpm.

Rotor type: swing out.

Tube capacity: 15ml.

Maximum number of tubes: 4.

Tube dimensions (d x l): 17 x 100mm, 13 x 75mm (with green adaptors), 10 x 75mm (with grey adaptors).

Max radius: 130mm.

Max RCF: 1100g.

Rating: 100W.

External dimensions: 361 x 400 x 320mm (WxDxH with lid closed)

Warranty period: 3 Years

Safety class: 1

Voltage: 230V AC, 50-60Hz

Packed weight: 10.9kg

Packed dimensions: 450 x 410 x 320mm

Operation: Rotor activated push button.

Code: 604-003

£595.00

D Vortex Mixer

Ideally sized for personal use, the Grant-bio PV-1 vortex mixer is compact, with a low profile and small footprint, to sit in almost any location. The PV-1 is so small that it will fit in your hand - yet there is no compromise on performance. The reliable motor produces regulated and reproducible agitation throughout the speed range. It is also extremely quiet. With variable speed from 750 to 3000 rpm, the PV-1 can be used for gentle through to vigorous mixing and pellet resuspension in 0.5ml, 1.5ml, and 15ml tubes.

Code: 604-006

£119.00

D



E Round Bottom Clear Tubes

Round bottom clear polystyrene centrifuge tubes. 16mm x 95mm, graduated 2.5, 5 and 10ml to suit TARGA.

Code: 603-064 - Pack of 20

£2.25

E



F Chromatography Paper

Chromatography Paper sheets 20x20cm.

Code: 708-017 - Pack of 100

£39.00

F



G Chromatography Plates

TLC 'Polygram' plates precoated with silica gel, average pore diameter 6mm, layer thickness, 0.25mm. With fluorescent indicator. A general purpose plate which can be used for most separations.

Code: 708-018 - Pack of 50

£49.95

G





A

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Colorimeter CO7500

The Biochrom WPA CO7500 colorimeter is a value for money instrument that has been designed for use in educational establishments such as schools and colleges. It is compact, lightweight and ergonomically designed to withstand student use! This makes it ideal for use in busy teaching laboratories. The large display is easy to read and the instrument is simple to both set up and use, giving rapid results. The samples can be measured in either standard or semi micro 10mm pathlength cuvettes or in 16mm diameter test tubes (adapters for 10/12 mm test tubes are available).

Code: 612-038	£385.00
Code: 612-039 - Spare Filter Set	£72.00
Code: 612-040 - Spare Lamp	£30.00
Code: 612-041 - Cuvettes	£35.00



B

B

Pocket Colorimeters

A new range of low cost colorimeters for water testing. Easier to use and more accurate than test kits. Ideal for use by engineers, small enough to fit in the pocket. Large digital display in ppm (mg/l), Built-in timer. Auto shut-off. Supplied with two cuvettes, one cap, reagents for 6 tests, battery, instructions and case. Battery type; 1 x 1.5V AAA

Code: 612-021	£42.00
- Free Chlorine 0.0 to 2.50 mg/l	
Code: 612-022	£7.00
- Free Chlorine Reagents for 25 Tests	
Code: 612-023	£42.00
- Total Chlorine 0.0 to 3.50 mg/l	
Code: 612-024	£7.25
- Total Chlorine Reagents for 25 Tests	
Code: 612-025	£42.00
- Iodine 0.0 to 12.5 mg/l	
Code: 612-026	£7.25
- Iodine Reagents for 25 Tests	
Code: 612-027	£42.00
- Iron 0.0 to 5.00 mg/l	
Code: 612-028	£6.75
- Iron Reagents for 25 Tests	
Code: 612-029	£42.00
- Phosphate 0.0 to 2.50 mg/l	
Code: 612-030	£8.50
- Phosphate Reagents for 25 Tests	
Code: 612-031	£42.00
- Nitrite 0 to 200 ppb	
Code: 612-032	£7.25
- Nitrite Reagents for 25 Tests	
Code: 612-033	£42.00
- Phosphorus 0 to 200 ppb	
Code: 612-034	£7.25
- Phosphorus Reagents for 25 Tests	

C Pocket Colorimeter Accessories

Accessories for Pocket colorimeters.

Code: 612-035 - Cuvettes, Pack of 4 £15.95

Code: 612-036 - Caps, Pack of 4 £8.90

Code: 612-037 - Cleaning solution £23.95



D Combustion Boat

Porcelain, with handle. 85 x 10 x 10 mm (LxWXH).

Code: 708-013 £4.00



E Combustion Tubes

Borosilicate glass, open both ends, for oxidisation and reduction of chemical substances. Length 30 cm.

Code: 708-014 - 17mm x11mm Bore £0.95

Code: 708-015 - 22mm x17mm Bore £1.25



F Combustion Tube

Borosilicate glass, for reduction of metal oxides with hydrogen. A small hole in the side of the lower end of the tube allows for the escape of gas.

Code: 708-016 - 150mm x25mm Bore £0.95

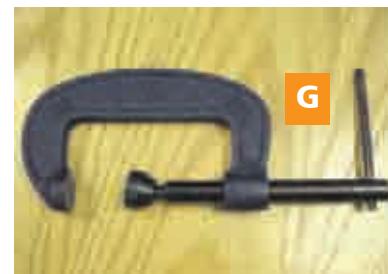


G 'G' Clamp

Drop-forged clamp finished with resistant coating.

Code: EDU870 - 75mm £3.50

Code: EDU885 - 100mm £7.95



**A****A****Crucible with Lid**

Porcelain crucibles with lid, glazed inside and outside except base.

Code: C74A - 15ml £1.00

Code: C74B - 25ml £1.25

**B****B****Stainless Steel Crucibles**

Stainless steel crucibles can be re-used, unlike porcelain which are single use. Material can be recycled. Can be dropped with no risk of fracturing or breaking. 0.7mm thick.

Code: 708-004 - 15ml, dia. 30mm £6.75

Code: 708-005 - 25ml, dia. 35mm £6.95

Code: 708-006 - 30ml, dia. 40mm £7.50

Code: 708-008 - 70ml, dia. 50mm £13.00

**D****D****Glass Measuring Cylinders**

Graduated borosilicate glass cylinder with spout, tall form with rounded base. Blue graduations. Class B.

Code: CY0401 - 5ml x 0.1ml £2.25

Code: CY0402 - 10ml x 0.2ml £2.50

Code: CY0403 - 25ml x 0.5ml £2.75

Code: CY0404 - 50ml x 1ml £3.00

Code: CY0405 - 100ml x 1ml £3.50

Code: CY0406 - 250ml x 2ml £4.50

Code: CY0407 - 500ml x 5ml £6.50

Code: CY0408 - 1000ml x 10ml £13.00

Code: CY0409 - 2000ml x 20ml £24.00

E Polypropylene Measuring Cylinders

Polypropylene measuring cylinders having excellent clarity and good chemical resistance. Autoclavable up to 130°C. These cylinders have raised graduations on the outer surface with an excellent easy-pour tapered spout.

Code: MCYL0010	- 10 x 0.2ml, Pack of 10	£9.50
Code: MCYL0025	- 25 x 0.5ml, Pack of 10	£10.50
Code: MCYL0050	- 50 x 1ml, Pack of 10	£10.75
Code: MCYL0100	- 100 x 1ml, Pack of 5	£9.25
Code: MCYL0250	- 250 x 2ml, Pack of 5	£14.00
Code: MCYL0500	- 500 x 5ml, Pack of 5	£19.75
Code: MCYL1000	- 1000 x 10ml, Pack of 5	£36.75
Code: MCYL2000	- 2000 x 20ml, Pack of 5	£21.50



F Polypropylene Measuring Cylinder Sets

Sets of polypropylene measuring cylinders having excellent clarity and good chemical resistance. The products are autoclavable up to 130°C. These cylinders have raised graduations on the outer surface with an excellent easy-pour tapered spout.

Code: EDU1039	£6.50
- Set of 5 (10, 25, 50, 100, 250ml)	
Code: EDU1031	£8.50
- Set of 6 (10, 25, 50, 100, 250, 500ml)	
Code: EDU1078	£18.00
- Set of 4 (10, 50, 100, 1000ml)	
Code: EDU1033	£21.00
- Set of 6 (25, 50, 100, 250, 500, 1000ml)	
Code: EDU866	£20.00
- Set of 5 (50, 100, 250, 500, 1000ml)	



G TPX Measuring Cylinders

Crystal clear autoclavable, graduated measuring cylinder. The cylinder is made from clear TPX for easy volume reading. The cylinder has a hexagonal base which provides excellent stability.

Code: 748-004 - 10ml	£1.80
Code: 748-005 - 25ml	£2.50
Code: 748-006 - 50ml	£2.95
Code: 748-007 - 100ml	£4.25
Code: 748-008 - 250ml	£7.50
Code: 748-009 - 500ml	£12.25
Code: 748-010 - 1000ml	£19.00





A

A

Drying/Warming Cabinets

The GENLAB Drying/Warming Cabinets are suitable for drying a range of items such as glassware and instruments, and for any general purpose warming applications.

Features and Specification:

Maximum temperature: 50°C above ambient
 Easy-clean powder coated body
 Thermostat control for set temperature
 Toughened glass doors, sliding
 Full two-year warranty.
 Three shelves
 Capacity: 125L & 250L
 Internal dimensions: 430 x 720 x 400mm & 520 x 980 x 480mm.

Code: 610-007 - 125L

£535.00

Code: 610-008 - 250L

£765.00



B

B

Insulated Drying/Warming Cabinets

The GENLAB Drying/Warming Cabinets are suitable for drying a range of items such as glassware and instruments, and for any general purpose warming applications. This insulated unit gives far greater temperature control, allowing greater accuracy during the drying and warming process. The resulting reduction in energy requirements gives a performance saving of over 30% compared to the non-insulated unit.

Features and Specification:

Maximum temperature: 50°C above ambient
 Easy-clean powder coated body
 Thermostat control for set temperature
 Toughened glass doors, sliding
 Full two-year warranty.
 Three shelves
 Capacity: 100L & 200L
 Internal dimensions: 400 x 670 x 370mm & 490 x 930 x 450mm.

Code: 610-009 - 100L

£705.00

Code: 610-010 - 200L

£995.00



C

C

Deflagrating Spoon & Cap

Steel cup and rod held in a dished aluminium cap. Length: 350mm; Cap: 90mm; Cup: 18mm.

Code: 612-019

£1.95

Code: DFSPNA - Pack of 20

£30.00

D Flask Stand

Polypropylene, stackable stand can be steam autoclaved. Will hold round bottom flask up to 10 litre capacity.

Code: CH0417

£13.50

D



E Filter Papers, Premium Grade

A good quality paper for general purpose use with medium retention and flowrate. 100 Circles/pack.

Code: FLP090 - 90mm, Pack of 100 £1.75

Code: FLP110 - 110mm, Pack of 100 £1.95

Code: FLP125 - 125mm, Pack of 100 £2.15

Code: FLP150 - 150mm, Pack of 100 £3.25

E



F Conical Flasks

A conical, borosilicate glass Erlenmeyer flask with a narrow neck. Class B.

Code: FL0702 - 50ml £0.95

Code: FL0703 - 100ml £1.25

Code: FL0705 - 250ml £1.45

Code: FL0707 - 500ml £1.95

Code: FL0708 - 1000ml £3.40

F



G Wide Neck Conical Flasks

A conical, borosilicate glass Erlenmeyer flask with a neck. Class B.

Code: 726-018 - 100ml £1.95

Code: 726-019 - 250ml £2.00

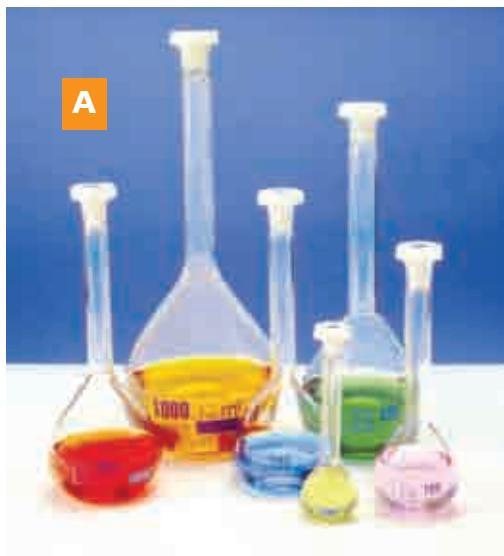
Code: 726-020 - 500ml £2.50

Code: 726-021 - 1000ml £3.95

Code: 726-022 - 2000ml £9.50

G



**A****A****Volumetric Flasks with Stoppers**

Volumetric, Borosilicate Glass with blue graduation. Fitted with chemical resistance stopper as per DIN standard 12664 and ISO1042. Class B.

Code: FL2603 - 25ml	£3.25
Code: FL2604 - 50ml	£3.25
Code: FL2605 - 100ml	£3.50
Code: FL2606 - 200ml	£5.95
Code: FL2607 - 250ml	£5.95
Code: FL2608 - 500ml	£6.95
Code: FL2609 - 1000ml	£11.00
Code: FL2610 - 2000ml	£20.00

**B****B****Round Bottom Flasks**

Borosilicate glass round bottom flask, narrow neck with rim. DIN 12347.

Code: FL1501 - 50ml	£3.95
Code: FL1502 - 100ml	£4.25
Code: FL1503 - 250ml	£4.50
Code: FL1504 - 500ml	£5.75

**C****C****Buchner/Filter Flasks**

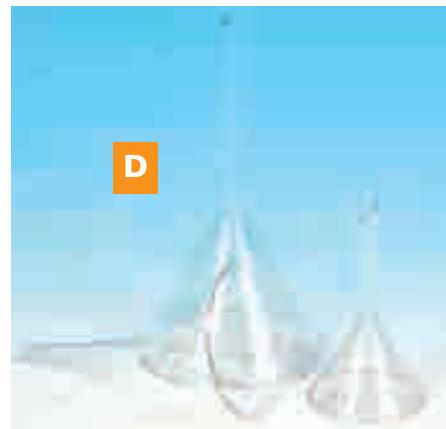
Excellent quality flask made from borosilicate glass.

Code: 726-013 - 100ml 19/26	£2.95
Code: 726-014 - 100ml 24/29	£3.45
Code: 726-015 - 250ml 24/29	£3.95
Code: 726-016 - 500ml 24/29	£5.95
Code: 726-017 - 1000ml 24/29	£9.50

D Filter Funnels

Borosilicate glass funnel, with typical long-stem construction. Unaffected by acids, alkalis etc.

Code: 726-029 - 35mm, Pack of 10	£17.00
Code: 726-030 - 45mm, Pack of 10	£18.00
Code: 726-001 - 55mm, Pack of 10	£19.00
Code: 726-031 - 75mm, Pack of 10	£22.00
Code: 726-032 - 100mm, Pack of 10	£33.00
Code: 726-033 - 150mm, Pack of 10	£125.00



D

E Thistle Funnel

Thistle funnel, neutral glass, stout walled. 250mm length. 25mm dia.

Code: CH0488B	£2.60
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E

F Polypropylene Funnels

Polypropylene, filter type, plain with long stem, unaffected by acids and alkali etc.

Code: EDU212 - 55mm, Pack of 10	£2.75
Code: EDU742 - 65mm, Pack of 10	£5.25
Code: EDU175/PK10 - 75mm, Pack of 10	£5.50
Code: EDU743 - 95mm, Pack of 10	£7.35
Code: C454SET - Set of 3, (50, 75 & 100mm)	£2.60
Code: EDU874 - Pack of 10, (5x75mm & 5x95mm)	£6.30



F

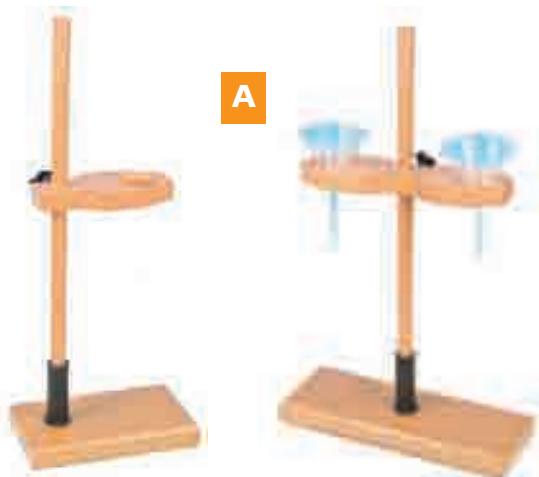
G HDPE Funnel

Funnels designed for multipurpose use. Make filling of carboys, drums and barrels very convenient. Handles make for ease in use.

Code: 726-023 - 200mm	£5.00
Code: 726-024 - 250mm	£7.00



G


A

B

Code	Top Dia. (mm)	Height (mm)	Paper dia. (mm)	Capacity (ml)
CH0462A	35	100	27	15
CH0462B	50	100	40	35
CH0462C	60	108	50	60
CH0462D	75	120	70	100
CH0462E	100	170	90	325
CH0462F	125	200	110	575
CH0462G	150	200	130	850
CH0462H	200	245	175	1950
CH0462I	250	260	230	4000
CH0462J	300	305	260	5200


D
C
A

Funnel Stands

Polished wood base with clamping screws. Rods are approx. 460mm x 16mm dia.

Code: CH0689A - Single

£10.50

Code: CH0689B - Double

£15.00

B

Buchner Funnels

Porcelain with straight sides above the perforated plate. For the full range of Buchner funnels and specifications for each please refer to the table opposite.

Code: CH0462A - 35mm

£2.40

Code: CH0462B - 50mm

£4.25

Code: CH0462C - 60mm

£7.00

Code: CH0462D - 75mm

£7.35

Code: CH0462E - 100mm

£7.95

Code: CH0462F - 125mm

£10.50

Code: CH0462G - 150mm

£13.50

Code: CH0462H - 200mm

£47.00

Code: CH0462I - 250mm

£58.00

Code: CH0462J - 300mm

£94.00

C

Gas Jars

Cylindrical, clear glass, ground flange and heavy foot. Supplied without covers. 50mm dia.

Code: C494A - 150mm, Pack of 10

£52.00

Code: C494B - 200mm, Pack of 10

£58.00

Code: C494C - 250mm, Pack of 10

£72.00

Code: C494D - 300mm, Pack of 10

£79.00

D

Gas Jar Covers

Circular sheet glass, ground one side.

Code: CH0496A - 50mm, Pack of 10

£2.60

Code: CH0496B - 65mm, Pack of 10

£2.75

Code: CH0496C - 75mm, Pack of 10

£3.15

Code: CH0496D - 90mm, Pack of 10

£5.50

Code: CH0496E - 100mm, Pack of 10

£5.75

E Beehive Shelf

Made of porcelain, glazed both inside and out. For use in pneumatic troughs for gas collection.

Code: BHSHL07 - 75mm	£2.25
Code: BHSHL10 - 100mm	£3.25



E

F Wooden Splints

For lighting burners or testing for oxygen etc. Supplied in bundles of approximately 1,000 splints.

Code: EDU740 - Pack of approx.1000	£3.80
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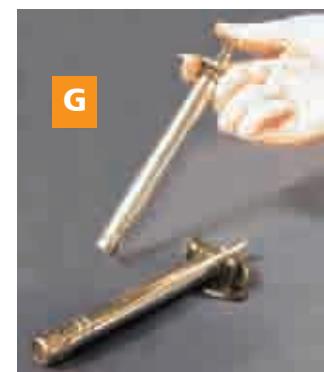


F

G Gas Lighter

Suitable for igniting the common fuel gases. Sparks produced by squeezing the handle. No battery required.

Code: EDU080	£5.50
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G

H Plain Wire Gauze

Plain gauze wire squares without ceramic centres.

Code: GUZPL125	£5.95
- 125 x 125mm , Pack of 10	
Code: GUZPL150	£6.50
- 150 x 150mm , Pack of 10	



H

I Wire Gauze

Square, with flat circular ceramic centre. Extra strong quality, well finished edges for safety. Packed in neat shelf cartons with inner protection and drying agent.

Code: GUZCR125	£6.75
- 125 x 125mm , Pack of 10	
Code: GUZCR150	£7.95
- 150 x 150mm , Pack of 10	



I

A



Borosilicate Glass Tubing

0.5m lengths.

Code: C745C - 6mm, Pack of 30 £25.00

Code: C745D - 7mm, Pack of 30 £27.00

Code: C745E - 8mm, Pack of 30 £29.00

B



B

Glass Tubing Cutter

With diamond scribing point on spring arm and aluminium alloy body with 'V' groove. Suitable for use with soda and borosilicate glass tubing.

Code: 707-001 £12.00

C



C

Diamond Glass Cutter

For cutting of sheets of glass up to 3 mm thick. Mounted in brass with wooden handle. Overall length 17.5 cm.

Code: 724-002 £5.00

D



D

Heating Mantles

Controlled heating mantle.

Specification:

Case construction: Steel, with chemical resistant coating Thermal

Insulation: Moulded silica powder.

Heating Element: Nichrome wire

Mantle: Woven glass fibre mat.

Element Temperature: Up to 450°C (Max).

Power Supply: 220V AC. 80W.

Code: 611-003 - 100ml £140.00

Code: 611-004 - 250ml £150.00

Code: 611-005 - 500ml £175.00

E Hotplate with Magnetic Stirrer

Case construction: Steel, with chemical resistant coating
 Stage Area: 180 x 180mm Temperature: Up to 400°C
 (Max) Speed Range: 100 ~ 1500 rpm.
 Power Supply: 220V AC.

Code: 607-019

£195.00

E



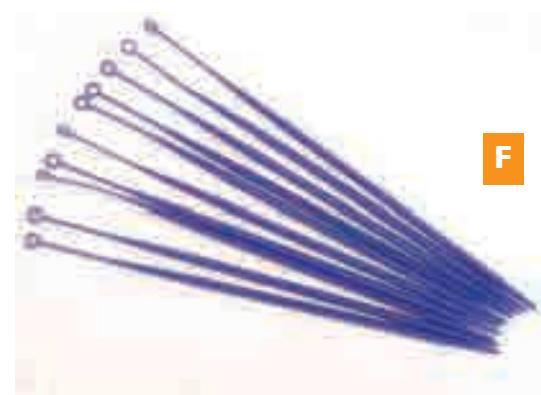
F Disposable Inoculating Loops

Sterile, disposable inoculating loop.

Code: 732-001 - Pack of 20

£1.35

F



G Measuring Jugs

Polypropylene measuring jugs having excellent clarity and good chemical resistance. The products are autoclavable up to 130°C. The jugs have raised graduations on the outer surface and an excellent easy-pour tapered spout.

Code: JUG0250 - 250ml, Pack of 10 **£23.00**

Code: JUG0500 - 500ml, Pack of 10 **£24.00**

Code: JUG1000 - 1000ml, Pack of 5 **£15.00**

Code: JUG02000 - 2000ml, Pack of 5 **£25.00**

Code: EDU781 **£6.50**

- Set of 3 (250, 500 & 1000ml)

Code: EDU1202 **£11.00**

- Set of 4 (250, 500, 1000 & 2000ml)

G



H Laser Pen

This inexpensive and lightweight laser pen is useful for ray optics demonstrations and simple diffraction work. In addition to this you can make your point on overhead images with this useful presentation tool.

Caution: Do not stare into the beam or view directly with optical instruments.

Code: 712-004

£22.00

H





A Incubators

The GENLAB General Purpose Incubators offer a range of highly efficient, reliable, cost effective units to suit most biological analysis, research and general laboratory applications.

Features and specifications:

Easy clean powder-coated body
 Direct reading thermostat
 Safety overheat thermostat
 Aluminium coated mild steel chamber
 Two shelves
 Full two year warranty
 Temperature range: ambient +5°C to 100°C
 Fluctuation: ±0.25°C @ 37°C
 Capacity: 18L, 30L, 40L, 50L & 75L
 Internal dimensions:
 260 x 260 x 270mm (18L)
 260 x 360 x 350mm (30L)
 320 x 360 x 350mm (40L)
 330 x 490 x 330mm (50L)
 330 x 490 x 450mm (75L)

Code: 610-011 - 18L	£495.00
Code: 610-012 - 18L + Visibility Door	£525.00
Code: 610-013 - 30L	£535.00
Code: 610-014 - 30L + Visibility Door	£545.00
Code: 610-015 - 40L	£575.00
Code: 610-016 - 40L + Visibility Door	£585.00
Code: 610-017 - 50L	£615.00
Code: 610-018 - 50L + Visibility Door	£645.00
Code: 610-019 - 75L	£705.00
Code: 610-020 - 575L + Visibility Door	£725.00



B Brass Masses

Small form slotted mass and hangers.

Code: MB001 - 1g	£0.70
Code: MB002 - 2g	£0.70
Code: MB005 - 5g	£0.75
Code: MB010 - 10g	£0.75
Code: MB020 - 20g	£1.00
Code: MB050 - 50g	£1.75
Code: MB100 - 100g	£2.75
Code: MHB010G - 10g, Hanger only	£1.55
Code: MHB020G - 20g, Hanger only	£1.90
Code: MHB050G - 50g, Hanger only	£2.35
Code: MHB100G - 100g, Hanger only	£3.30

C Brass Mass Sets

Small form slotted mass and hanger sets.

Code: EDU087	£7.25
- 100g total (10g Hanger, 9 x 10g Masses)	
Code: EDU088	£19.50
- 500g total (50g Hanger, 9 x 50g Masses)	
Code: EDU089	£35.50
- 1000g total (100g Hanger, 9 x 100g Masses)	
Code: P260	£6.50
- 100g (20g Hanger and 4 x 20g Masses)	
Code: P262	£13.00
- 250g (50g Hanger, 9x20g, 1x10g, 2x5g Masses)	
Code: EDU1025	£22.00
- 438g total (50g Hanger and 1 each of : 200g, 100g, 50g, 20g, 10g, 5g, 2g & 1g)	



D Cast Alloy Masses

Slotted masses. Flat, with large central hole and small slot to prevent masses sliding off hanger. Manufactured from cast alloy, accuracy 1%.

Code: EDU877 - 10g, Pack of 3	£2.25
Code: EDU878 - 20g, Pack of 3	£3.50
Code: EDU879 - 50g, Pack of 3	£5.95
Code: EDU903 - 100g, Pack of 5	£12.00
Code: EDU880 - 50g Hangers, Pack of 3	£7.95
Code: EDU902A - 100g Hangers, Pack of 5	£18.00



E Cast Alloy Mass Sets

Small format cast alloy mass & hanger sets.

Code: EDU904	£9.00
- 100g (9x10g Mass, 1x10g Hanger)	
Code: EDU904A	£30.00
- 100g (9x10g Mass, 1x10g Hanger), Pack of 4	
Code: EDU905	£14.50
- 1000g (9x100g Mass, 1x100g Hanger)	
Code: EDU905A	£50.00
- 1000g (9x100g Mass, 1x100g Hanger), Pack of 4	



A

A Cast Masses

Large format slotted masses.

Code: EDU771 - 100g	£3.00
Code: EDU772 - 200g	£4.25
Code: EDU773 - 500g	£6.25
Code: EDU774 - 1000g	£8.95
Code: EDU775 - 2000g	£17.00
Code: EDU776 - 5000g	£29.00
Code: EDU777 - 10,000g	£58.00
Code: EDU778 - 500g, Hanger only	£7.00
Code: EDU779 - 1000g, Hanger only	£14.75



B

B Hexagonal Masses with Ring

Hexagonal iron mass with lifting ring.

Code: HEX50 - 50g	£3.25
Code: HEX100 - 100g	£3.50
Code: HEX200 - 200g	£3.75
Code: HEX500 - 500g	£5.95
Code: HEX1000 - 1000g	£7.50
Code: HEX2000 - 2000g	£17.50
Code: HEX5000 - 5,000g	£37.50



C

C Weighing Set on Tray

A combined set of accurate steel and brass weights that are housed in a sturdy blue moulded tray. Provides for weighing objects from 10g to 1990g in 10g increments. 3 steel weights and 6 brass weights.

Contents:

1 each of - 1kg, 500g, 200g, 50g, 20g; 2 each of - 100g & 10g; 1 Moulded Tray.

Code: EDU769 **£27.00**

D Melting Point Apparatus, Simple

Basic equipment for determining the melting point of substances. Consists of an aluminium block with hole for thermometer (not supplied). Ideal for individual student use.

Code: EDU990T

£22.00



E Melting Point Apparatus

This ergonomic apparatus has been designed with safety and ease of operation in mind, making it ideal for use in education and industry alike. A single control knob on the front panel incorporates the mains ON/OFF switch with arbitrary scale of 0 to 10. A rapid heat switch allows higher temperatures to be obtained quickly. Sample tubes are illuminated from behind and magnified through a lens. A selector at the rear of the instrument allows a light or dark background. Ceramic insulation around the aluminium heating block minimises heat transfer to the casing. Supplied with instructions.

Electrical supply: 230V AC, 50/60Hz

Weight: 1.5kg

Temperature range: Ambient to + 350°C

Code: MELTP

£385.00



F Capillary Melting Point Tube

Capillary melting point tube, borosilicate glass, wall thickness 0.2mm.

Code: CH0882 - Pack of 100

£3.95

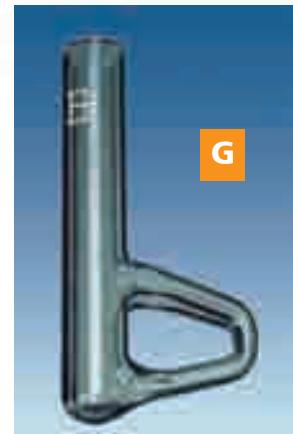


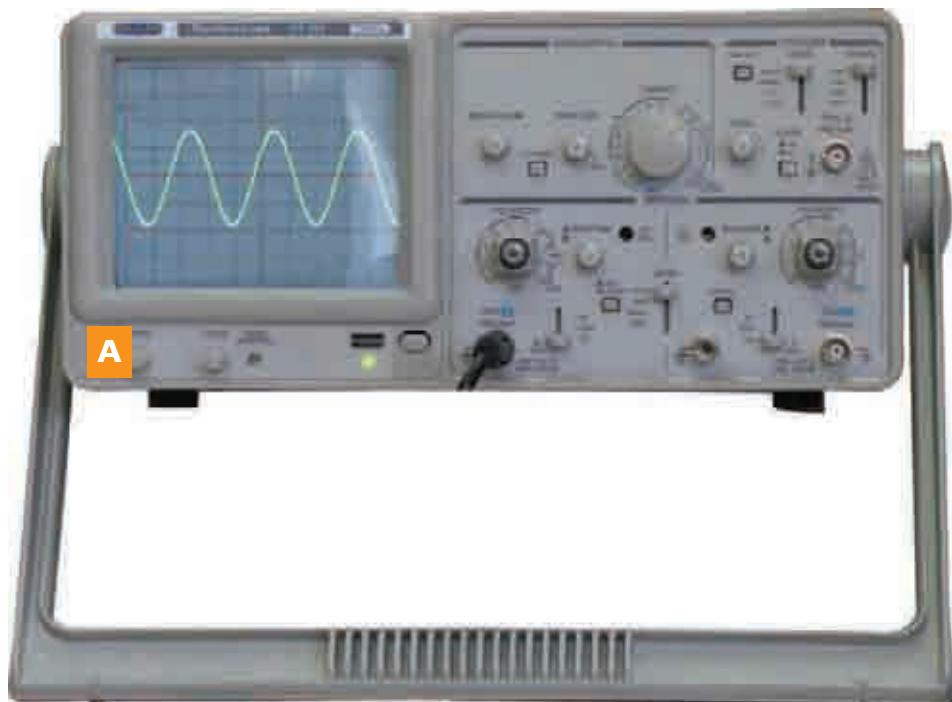
G Thiele Melting Point Tube

Borosilicate glass, for determining the melting point of organic compounds. Diameter of tube: 25mm. Length: 150mm.

Code: CH0884

£12.50




A

Oscilloscope

Features includes:

20MHz Dual Channel; High Sensitivity 1mV/DIV; 5mV/DIV Sensitivity on Both Channels; CH1 & CH2 Independent Channels; CH1 Signal Output; Two waveforms in different frequency can be observed via alternative trigger function; High-speed sweep; Algebraic Addition and Subtraction; X-Y Operation; 0.2 μ s/div to 0.5s/div Time Base(Uncal up to 20ns); Z Modulation TTL Level; 8 x 10 cm Display Internal Graticule; TV signal synchronous function, TV Triggering Frame (V) & Line (H); Line Trigger, ALT Triggering. [Detailed technical data available on request.](#)

Code: 241-511

£305.00


B

Ovens

The GENLAB General Purpose Ovens are a range of highly efficient, reliable, cost effective units to suit most drying, warming and general laboratory applications.

Features and specification:

- Temperature range: 40 to 250°C
- Fluctuation $\pm 0.75^\circ\text{C}$
- Easy clean powder-coated body
- Aluminium coated mild steel chamber
- Direct reading thermostat
- Safety overheat thermostat
- Full two year warranty
- One shelf
- Capacities: 6, 18, 30, 40, 50 & 75L
- Interior dimensions:
150 x 230 x 190mm (6L); 260 x 260 x 270mm (18L)
240 x 360 x 350mm (30L); 320 x 360 x 350mm (40L)
330 x 490 x 330mm (50L); 330 x 490 x 450mm (75L)

Code: 610-001 - 6L **£449.00**

Code: 610-003 - 18L **£485.00**

Code: 610-004 - 30L **£515.00**

Code: 610-005 - 40L **£575.00**

Code: 610-002 - 50L **£595.00**

Code: 610-006 - 75L **£735.00**

C Test Papers

Plastic Case of 10 books each with 20 leaves.

Code: CH0625G - Cobalt Chloride	£2.75
Code: C622A - Litmus Red	£2.25
Code: C622B - Litmus Blue	£2.25
Code: C622C - Litmus Neutral	£2.25
Code: C627 - Universal Indicator, pH1-11	£2.75
Code: EDU893 - Universal Indicator, pH1-14	£3.15



D pH Indicator Dispenser

Indicator paper supplied in plastic dispenser containing 5 metres of 8mm wide test strip. A colour chart is provided on the side of the dispenser.

Code: CH0627A - pH 1-14	£4.50
Code: CH0627B - pH 1-11	£4.50



E Test Strips

Code: PR0250 - Protein, Pack of 50	£7.90
Code: GLU101 - Glucose, Pack of 50	£9.45





A

pH Turtle with Electrode & Software

A sophisticated yet easy-to-use transmitter that turns any PC into a pH meter. Simply plug it into your PC's serial port and go! The user-friendly software allows continuous real-time data logging right from the desktop.

The main software window displays a virtual pH meter, a continuously updating table of logged data and a real-time graph. Manual temperature compensation, log on demand, logging interval and even high & low alarm settings are easily programmed from your keyboard. It is supplied with a double-junction, refillable pH electrode to ensure a long life, even in varied and unclean samples.

The pH Turtle can be easily calibrated on 1, 2 or 3 points through your keyboard. The meter automatically recognizes pH 4, 7 and 10 buffers. User can set high and low alarms which can be visually displayed in graph and table windows. The software can also provide an audible 'beep' whenever the value is outside the desired interval. The pH Turtle is supplied complete with Windows® Compatible Software, 1m Cable with RS-232 Connector, pH Electrode and instructions.

Specifications:

Accuracy of pH at 20°C/68°F ± 0.2

Dimensions (OD x H) 88 x 40mm

Environment

Environment (Temp) 0° to 50°C; (RH) 95%

Temperature Compensation (°C) Manual 0° to 100°

Typical EMC Deviation of pH ± 0.2

Weight Metric 250 g

pH Calibration Automatic 1, 2 or 3 points through keyboard

pH Range 0.0 to 14.0; pH Resolution 0.1

Code: 614-013

£62.00



B

Hand Held pH Meter

A rugged, portable pH meter with simple-to-use rotary dial and manual two-point calibration. Temperature compensation can be set manually to improve pH accuracy. Supplied with a double junction pH electrode with 1m cable.

Specification:

Range: 0.0 -14.0 pH

Battery life:100 hours approx.

Dimensions: 185 x 82 x 53mm

Weight: 265g

Code: 614-010

£145.00

C Compact pH/C Meter with pH Electrode

pH meter designed for use where space is at a premium. Featuring the main requirements of a laboratory pH meter: auto temperature compensation; auto calibration; an accuracy of ± 0.02 pH; can be run on mains or battery power. Because of its small footprint, built-in beaker and electrode stand the meter can be used practically anywhere. A large dual-level LCD display reads both pH and temperature simultaneously. Supplied with combination pH/C probe, plastic beaker, electrode holder, calibration solutions, mains power cable and battery.

Features and specification:

- pH electrode with temperature sensor
- Built-in beaker holder and beaker-top electrode holder
- Small desk top footprint - 190 x 105mm
- Reads pH and temperature
- Large LCD screen
- Easy one-button calibration
- Mains or battery operated
- pH range: -2.00 to 16.00
- pH Resolution: 0.1
- pH accuracy: ± 0.02
- Temperature range: -5.0 to 105.0°C
- Temperature resolution: 0.1°C
- Temperature accuracy: $\pm 0.5^\circ\text{C}$ up to 60°C; $\pm 1^\circ$ up to 105°C or $\pm 1^\circ\text{F}$ up to 140°; $\pm 2^\circ\text{F}$ up to 221°F
- pH calibration: Auto at 1 or 2 points
- Power supply: 230V AC Mains to 12V DC, or 9V battery
- Dimensions (W x D x H): 190 x 105 x 50mm
- Weight: 450g

Code: 614-011 £199.00

Code: 614-012 - with Magnetic Stirrer £235.00



C



D

D Digital pH Meter

A robust, inexpensive, hand held pocket LCD pH meter with 0.01 resolution and standard combination electrode with screw fit. Ideal for laboratory use or where a quick and easy reading is required.

- Range: 0 to 14 pH
- Resolution: 0.01 pH
- Accuracy: ± 0.2 pH
- Calibration: Manual two point
- Operating temp.: 0 to 50°C
- Dimensions: (incl. electrode) 180 x 50 x 25mm

Code: EDU1032 £32.00



E

E Pocket pH Meter

A lightweight, splash proof, pocket size tester. Ideal for pH spot reading precise to 0.1 pH with large easy to read LCD display. Supplied in case with 3 x 1.5V alkaline batteries. Battery life 700 hours approx.

- Range: 0.0 to 14.0 pH
- Resolution: 0.01pH
- Environment: 0 to 50°C
- Accuracy: ± 0.1 pH
- Mass: 85g
- Dimensions: 150 x 30 x 24mm

Code: CH0892 £59.00



A Pestle & Mortar

Porcelain with unglazed grinding surface.

Code: PM80 - 50ml, 80mm dia.	£3.50
Code: PM90 - 150ml, 90mm dia.	£4.25
Code: PM100 - 175ml, 100mm dia.	£4.50
Code: PM130 - 300ml, 130mm dia.	£4.95
Code: PM150 - 500ml, 150mm dia.	£11.00



B Petri Dishes

Dishes are produced from cytotoxicity tested, FDA approved virgin polystyrene with triple vents and high optical clarity.

Code: 101VR20 - 90mm, Pack of 20	£2.25
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C Glass Petri Dishes

Borosilicate Glass 90mm.

Code: 760-001 - 90mm, Pack of 10	£10.50
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D Petri Dish Rack

Clear acrylic with white polycarbonate posts. This handy rack will hold 60 Petri dishes of 90mm diameter. Useful during inoculation, incubation and storage.

Code: CH0376	£52.00
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E Diji Liquid Handling System

diji is the unique new instrument for handling laboratory liquids. diji combines the positive displacement features of a syringe with the traditional graduations of a pipette, making it simple and easy to use - in the laboratory or in the field.

Half syringe + half pipette = half the effort

diji liquid handling equipment leads the field in:

Accuracy	Safety	Reliability	Ease of use
Precision		Durability	

Liquids are dispensed or aspirated by nestling the hand-piece in the palm of the hand and stroking the piston rod, with the thumb, in a very relaxed and natural way. The operator can not suck liquid into the wrong places therefore contamination is eliminated and cleaning is easier. diji is autoclavable when assembled or dismantled.

diji consists of simple parts and is easily repairable:
Simple PTFE (Teflon®) seal assembly; piston rod assembly;
borosilicate glass Syrette; handgrip.

Grade B

Code: EDU1000 - 10ml	£15.75
Code: EDU1001 - 25ml	£15.75
Code: EDU1000/5 - 10ml, Pack of 5	£73.50
Code: EDU1001/5 - 25ml, Pack of 5	£73.50

Grade A

Code: 712-008 - 10ml	£18.00
Code: 712-018 - 25ml	£18.00



E



F One Mark Pipettes

Borosilicate glass, bulb form, single graduation on upper stem and colour coded.

Code: CH0558A - 1ml, Blue	£1.75
Code: CH0558B - 2ml, Orange	£1.75
Code: CH0558C - 5ml, White	£1.75
Code: CH0558D - 10ml, Red	£1.95
Code: CH0558E - 15ml, Green	£2.75
Code: CH0558F - 20ml, Yellow	£2.95
Code: CH0558G - 25ml, Blue	£3.25
Code: CH0558H - 50ml, Red	£3.75



F



A Pipettes

Pipette, straight form, neutral glass, graduated.

Code: CH0564A - 1ml X 0.01ml	£2.95
Code: CH0564B - 2ml X 0.02ml	£2.95
Code: CH0564C - 5ml X 0.05ml	£2.95
Code: CH0564D - 10ml X 0.1ml	£2.75
Code: CH0564E - 25ml X 0.2ml	£5.00

B Dropping Pipettes

125mm glass body pipette with rubber teat. Useful for dispensing liquid from test tubes.

Code: EDU163 - Pack of 20	£4.25
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C Disposable Graduated Pipettes

Translucent pipettes with precise graduation and good chemical resistance. Length: 155mm.
3ml x 0.5ml graduations

Code: EDU655 - Pack of 40	£2.25
Code: EDU655A - Pack of 500	£12.00

D Rubber Teats

Rubber bulb teats for use with dropper pipettes.

Code: CH0232A - 50ml, Pack of 20 £10.50



E Rubber Teats

Heavy weight rubber bulb, for pipettes & medicine droppers. Diameter 5 to 6mm.

Code: CH0232B - 1ml, Pack of 20 £10.50



F Latex Teats

Latex bulb fits diameter 6 to 8 mm.

Code: CH0232C - 2ml, Pack of 20 £10.50



G Rubber Teats

Rubber, pear-shaped teats for use with pipettes etc.

Code: CH0230A - 5ml, Pack of 20 £10.50

Code: CH0230B - 10ml, Pack of 20 £10.50

Code: CH0230C - 15ml, Pack of 20 £10.50

Code: CH0230D - 25ml, Pack of 20 £14.50

Code: CH0230E - 50ml, Pack of 20 £21.00

H Rubber Teats

For use with dropper pipettes etc.

Code: C232 - 2ml, Pack of 10 £5.25



I Pipette Filler

Bulb-type rubber pipette filler for pipetting noxious solutions, microbial suspensions and other harmful and unpleasant solutions. Consists of a bulb and three pinch valves controlling influx and efflux of the pipette contents. Bulb diameter: 54mm.

Code: C6586A £34.00

J PI Pump Pipette Filler

Fast-release pipetting device for precise pipetting or zip-quick emptying. The thumb wheel can be rotated to precisely draw up or dispense liquids, or alternatively the releaser may be pushed in for virtually instant emptying. The moulded chuck has a silicone rubber collar inside to hold various pipettes of standard sizes. It resists acids and alkalis and can be easily disassembled for thorough cleaning.

Code: PIPUMP2 - 2ml £8.50

Code: PIPUMP10 - 10ml £8.50

Code: PIPUMP25 - 25ml £8.50



**A****Pipette Stand**

Polished wooden stand, two sided. Height: 230mm
Width: 260mm Depth: 120mm.

Code: C589 - 12 horizontal

£23.00

**B****B****Pipette Stand**

This autoclavable stand is two sided, with two ends joined to each other with three metal rods, all coated with polypropylene, to hold the pipettes.

Code: C592 - 12 horizontal

£19.95

**C****C****Pipette Stand**

A polished, wooden stand, with four rubber feet, which holds 12 or 24 pipettes vertically. Height: 41 cm. Width: 36cm. Depth: 11cm.

Code: C588 - 12 vertical

£18.00

Code: C590 - 24 vertical

£36.00

**D****D****Pipette Stand**

Stable, high-density polypropylene stand. Adjustable discs to accommodate different pipette lengths.

Code: C594 - 28 vertical

£37.00

E Pipettor, Variable Volume Pipettes

A range of user friendly micropipettes with variable digital volume deliveries. The pipettes are adjustable, air displacement units made to the highest standards.

Code: CH0582A - 0.5-10µl x 0.1µl	£58.00
Code: CH0582B - 2-20µl X 0.1µl	£58.00
Code: CH0582C - 5-50µl X 1µl	£58.00
Code: CH0582D - 10-100µl X 1µl	£58.00
Code: CH0582E - 20-200µl X 1µl	£58.00
Code: CH0582F - 100-1000µl X 10µl	£58.00

E



F Pipettor, High Volume Pipettes

Specially designed for safe day-to-day laboratory pipetting and dilution work. Eradicates use of glass pipettes and dangerous mouth pipetting. With an increment of 0.1 ml., they provide high accuracy not achievable with conventional glass pipetting in reagent preparations, dilutions, colorimetric tests and cell cultures.

Calibration and specifications conform to DIN 12650.

Code: CH0584A - 1-5ml x 0.1ml	£65.00
Code: CH0584B - 2-10ml X 0.1ml	£65.00

F



G Vari-Fix Micropipettes

Designed for critical low volume pipetting for application in molecular biology, biotechnology, DNA amplification, DNA sequencing, restriction enzyme and immuno assays. With specially designed position, it handles volume down to 0.5 microlitre with outstanding accuracy and reproducibility.

Code: CH0583A - 5-25µl	£72.00
Code: CH0583B - 10-50µl	£72.00
Code: CH0583C - 100-500µl	£72.00

G



H Micropipette Tips

Tips for use with fixed and variable volume micropipettes

Code: CH0587A - 10µl, Pack of 100	£6.50
Code: CH0587B - 200µl, Pack of 100	£7.00
Code: CH0587C - 1000µl, Pack of 100	£8.00
Code: CH0587D - 5000µl, Pack of 100	£9.00
Code: CH0587E - 10,000µl, Pack of 100	£11.00

H





A Power Supply

AC/DC power supply with cooling fan and built in microprocessor overloading protection.

Input: 230V AC, 50Hz; Output: 2-12V AC/DC in 6 steps.

Code: 605-001

£99.00

Code: 605-002 - Smoothed

£99.00

B Dual ±15V Power Supply

The Edu-Lab dual rail ±15V power supply is a very robust power supply for use with operational amplifier circuitry. It provides ample current of 1A and is short-circuit proofed. Each power unit is individually trimmed to precisely ±15V. Independent earth connection. Shrouded output sockets for standard 4mm plugs or shrouded plugs.

Specification:

Input: 230V ±10%, 50Hz/60Hz
 Output: Dual Rail ±15V, continuously rated at maximum of 1A
 Dimensions: 208 x 155 x 115mm (W x H x D).
 Height including handle is 187mm
 Slow-blow fuse protection for primary.
 Thermal trip for transformer.
 Short-circuit proofed, regulators with thermal shut down facilities.

Code: 605-010

£135.00

C High Tension Power Supply

The Edu-Lab High Tension Power supply is designed specifically for thermionic experiments, such as the Teltron double fine beam tube. It can also be used for experiments requiring a high tension supply such as ionization current etc. It provides two independent outputs of 0-35V and 0-350V, 100mA maximum, with continuously adjustable voltages. Two auxiliary cathode heater outputs are also provided. All outputs are fully isolated from earth. Bright 12.5mm green LED display indicating HT output. Shrouded sockets suitable for standard 4mm plugs or shrouded plugs.

Specification:

Input: 220V-240V, 50/60 Hz
 Outputs: 0-35 and 0-350V, fully regulated and maximum current is 100mA
 Mains supply: 230V ±5%, 50Hz
 Fuse: 1A (L)
 Dimensions: 208 x 155 x 115mm (W x H x D).
 Height including handle is 187mm.
 Primary is protected by slow-blow fuse and thermal trips.
 Two auxiliary output of 6.3V a.c. 1A for cathode heaters, protected by resettable fuse.
 Independent Earth Terminal is provided.

Code: 605-007

£305.00

D Laboratory Bench Power Supply

Output voltage selected by up/down push switches in 1V steps, up to 13V. Long switch lifetime. Voltage can be switched safely at full load without serious contact wear. Output protection is handled by a 30A heavy duty relay. The outputs are opened momentarily, controlled by μ P, between switching times. Fully protected secondary by high speed, micro-processor controlled and resettable electronic trip. Over current is measured and timed for cases of serious overload and slight overload to decide tripping time, so as to avoid oversensitive tripping in cases of initial heavy current surge, for example lamp bulbs. Slow-blow fuse protection for transformer primary. Shottky barrier diodes are employed for rectification with less voltage drop and power waste thus eliminating the need for a noisy internal cooling fan.

Specification:

Size: 205 x 150 x 115mm (W x H x D).

Input voltage: 240V, 50Hz.

Output voltage: 0-13V a.c. at no load. Slightly smoothed d.c gives practical r.m.s values of 0-13V at no load.

Code: 605-003

£149.00



E Smoothing Unit

A smoothing unit for reducing ripple from non-regulated power supplies. Maintains a ripple-free output when high currents are drawn. The unit comprises a lightweight and efficient toroidal 0.1H inductor with a network of 2,200uF capacitors and diodes. With a supply of 12V at 3A, 1% ripple would be typical. Will work without suffering damage even at reverse polarity. Up to 8A at 35V, absolute maximum 40V d.c. (d.c. rectified from 28V a.c.). Shrouded sockets accept standard 4mm plugs and shrouded plugs.

Specification:

Input Voltage: 0 to 35V, absolute maximum 40V

Current rating: 8A maximum

Dimensions: 208 x 155 x 115mm (W x H x D)

Height including handle is 187mm.

Code: 605-009

£105.00



F Electromagnetic Power Supply

Low Voltage, high current power supply for uses with Westminster electromagnetic kits, Fleming's apparatus, etc. 1-0-1V nominal a.c., allow students access to a.c. of 1V or 2V d.c output is furnished by rectification of 2V a.c (unsmoothed) Short-circuit current is 10A. Tolerates short circuit. Transformer is protected by thermal fuses and slow-blow fuse 40A Shottky barrier diode for robust and efficient rectification

Specification:

Input voltage : 230V $\pm 10\%$ 50Hz

Outputs: 1-0-1V a.c., 2V d.c nominal

Dimensions: 208 x 155 x 115mm (W x H x D)

Height including handle is 187mm.

Code: 605-008

£105.00





A Variable Power Supply

A popular, advanced, continuously-variable power supply unit with LED digital display, the Edu-Lab College Power Supply Unit is ideal for demonstration purposes and for use by students in advanced level courses. It provides a fine and smooth, continuously-variable AC or DC voltage at a combined maximum current of 8.5A. The DC is smoothed by an internal 2200 μ F capacitor. AC or DC voltage reading is selected by a toggle switch and indicated by a bright green, easy-to-read 12.5mm LED display. Microprocessor tripping circuitry will differentiate between a real short-circuit or a temporary current surge.

Specification:

Output Voltage continuously variable by rotary knob from 0 to 25V

Continuously rated combined current of 8.5A, AC or DC
Heavy-duty 40A Schottky barrier diodes employed for rectification, together with high performance toroidal transformer, reduce the weight of the power supply and power waste - thus eliminating the need for a noisy and troublesome cooling fan.

Digital display for voltage for AC or DC, selected by toggle switch

Fully protected secondary by high speed, resettable microprocessor-controlled trip.

Slow-blow fuse-protection for primary.

Thermal fuse protection for transformer.

Dimensions: 300 x 115 x 155mm (W x D x H)

Weight: 5.5kg

Code: 605-013

£245.00

B Hand Operated Vacuum Pump

A lightweight hand operated vacuum pump, drawing 15cm³ per stroke, up to a maximum vacuum of 50mmHg. It can be used to produce positive gauge pressures up to 2atm.

Code: 251-001

£105.00

C Electric Vacuum Pump

Being very quiet and with low energy consumption, this rotary vacuum pump is ideal for all general laboratory applications requiring vacuum.

Displacement: 1 litre per second.

Vacuum Limit: 0.01.

ATM Rotational speed: 1300 rpm.

Pumping Speed: 1 litre per second.

Code: 612-001

£240.00

D Signal Generator & Amplifier

Specification:

Frequency Range: 0.1 Hz to 99.9 KHz in six decades, read on digital display.
 Frequency Accuracy: 0.01% (100 ppm) in all ranges
 Output waveform: Sine, Rectangular and Triangular
 High Impedance Output: Maximum 17V peak to peak from internal source impedance of 600ohm
 Low Impedance output: 6V R.M.S. at 4ohm (about 8.8V peak for all waveforms)
 Maximum Power output of 4.5W available over the entire frequency range for all waveforms.
 Maximum Power Transfer occurs when the load is 4ohm, giving $62/(4+4) = 4.5W$
 Amplitude Control: Variable from zero to maximum output in 256 increments, amplitude is displayed by a 10 segment bar graph
 Attenuation: x1, x0.1, x0.01, ±1%, operating only on the 600ohm output.
 Amplifier voltage gain: 100
 Frequency Response: DC to 100KHz, -3 dB, output power 4.5W into 4ohm load
 Controls : All control settings except amplitude are stored and updated upon any changes.
 Electric Supply: 220V~240V, 50Hz
 Internal fuse is T315mA L
 Dimensions: approx. 210mm x155mm x 118mm L X W x D
 Weight : Approx. 2.05kg , without power cord

Code: 241-022

£275.00



D

E Sandbags

A stout canvas bag with draw-string. In use 1kg or 20kg of sand or gravel is put in the bag to give a convenient 10N or 20N load for large-scale mechanics investigations.

Code: 30-220 - 10N

£13.00

Code: 30-225 - 20N

£14.00



E

F Spectrophotometer WPA S800

The Biochrom WPA S800 visible spectrophotometer is compact, lightweight and ergonomically designed. It is ideal for student use with a large display that is easy to read. It is simple to set up and use giving rapid results. Accepts standard 10mm pathlength cuvettes or a test tube adaptor set is available for use with 10, 12 and 16 mm tubes. Measures Absorbance, % Transmission and Concentration as well as being able to output absorbance-time plots directly to chart recorder. The user manual includes simple experiments for the determination of λ max, extinction coefficient and natural bandwidth as well as the construction of a standard curve and the measurement of stray light.
 Wavelength range: 330-800nm; 7nm bandwidth.

Code: 609-001

£1,384.00



F



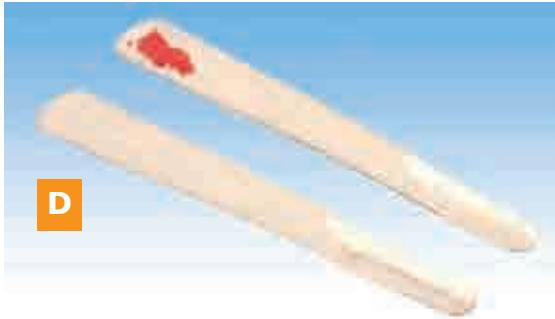
A



B



C



D



E



F

A

Chattaway Spatula

Chattaway type; one end flat and the other end canted up. Polished finish. Packs of 10.

Code: SPCHT150/PK10 - 150mm £23.00

Code: SPCHT200/PK10 - 200mm £29.00

B

Spoon End Spatula

Well finished and polished stainless steel spatula, with one end flat and the other end spoon form. Packs of 10.

Code: EDU084/PK10 - 150mm £17.75

Code: EDU085/PK10 - 200mm £18.75

Code: EDU085A - 300mm £19.95

C

Nuffield Spatula

Nuffield pattern spatula. Pack of 10.

Code: SPNUF140/PK10 - 140mm £7.25

D

Trulla Spatula

Trulla spatula, stainless steel, double ended with trowel-shaped scoops for handling large quantities of material. Width: 15mm.

Code: SPTRUL175 - 175mm, Pack of 10 £19.50

E

Polypropylene Spatula

Polypropylene spatula with a spoon on one end and a flat, knife-edged face on the other end.

Code: CH0631A - 150mm, Pack of 20 £19.95

Code: CH0631B - 200mm, Pack of 20 £19.95

F

Palette Knife Spatula

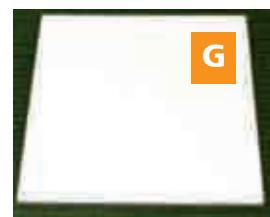
Flexible blade & parallel sides set in wooden handle.

Code: CH0640 - 155mm £10.00

G Ceramic Spotting Tiles

Code: EDU009 - Pack of 5

£9.00



H Polypropylene Spotting Tiles

High quality polypropylene tile with 12 cavities.
Autoclavable.

Code: EDU770 - Pack of 10

£15.00



I Retort Stand Base

A sturdy cast-iron base, finished in blue/black, with a tapped hole to accept a rod with 10 x 1.5mm thread.

Code: BASE160T - 160 x 100mm £5.25

Code: BASE200T - 200 x 125mm £7.25

Code: BASE250T - 250 x 160mm £11.50



J 'A' Shaped Retort Base

Cast-iron, finished in blue coating with tapped hole
10 x 1.5mm metric thread. Length of side 200mm.

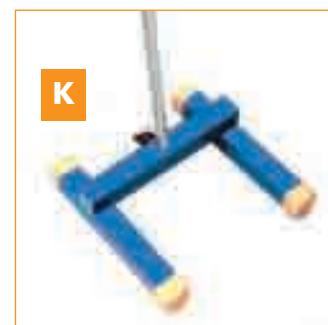
Code: EDU729 £13.00



K 'H' Shaped Retort Base

Accepts rods 8-12mm dia. Size: 200 x 200mm.
Weight: 3kg. Plastic ends.

Code: EDU730 £22.00





A Mild Steel Retort Rods

With 10 x 1.5mm metric thread.

Code: RDMS0500 - 500mm £2.80

Code: RDMS0600 - 600mm £3.25

Code: RDMS0750 - 750mm £4.50



B Aluminium Alloy Retort Rods

With 10 x 1.5mm metric thread.

Code: RDAL0500 - 500mm £3.75

Code: RDAL0600 - 600mm £4.50

Code: RDAL0750 - 750mm £4.75

Code: RDAL1000 - 1000mm £5.25



C Doublehead Bossheads

Doublehead, die-cast bossheads to hold rods of 5-20mm. Plastic clamping screws for tightness.

Code: BOSS1 - chrome £5.25

Code: BOSS2 - Anodised £5.25



D Bossheads

For use with retort stand rods. Die-cast alloy accepts rods up to 16.5mm diameter at right angles to each other. Finished in high-quality coating. Metal edges well finished for safe use.

Code: CH0663B/SINGLE £1.95

Code: CH0663B - Pack of 20 £32.00



E Swivel Bossheads

Zinc, die-cast, to hold rods up to 16mm. Two rods can be fitted at any angle.

Code: CH0666 - Pack of 5 £41.00

F Retort Clamp with Cork Jaws

Four prong, cork jaw clamp finished in high quality blue coating. The clamp accepts articles from 2 - 90mm dia. Rod length 145mm. The design of the jaw ensures a firm grip at all angles of opening. The cork liners are well secured to the jaws of the clamp. Overall length: 245mm.

Code: CLMPCRK £5.00



F

G Retort Clamp & Boss Combined

Diecast alloy clamp retort with lined jaws and bosshead which accommodates rods up to 15mm dia.

Code: CH0687 £8.50
Code: CH0688 - Rubber Jaws £8.50



G

H Retort Clamp with Rubber Jaws

Made with rubber lined, diecast jaws. Clamping rod operates through swivels mounted neatly in the jaws. Mounted on a 135mm rod of 8mm diameter. Jaw capacity 90mm and overall length 250mm.

Code: CLMP3P £5.00



H

I Retort Ring

Mild steel, plated retort ring with 8mm dia. stem. Stem Length: 140mm.

Code: CH0668A - 50mm id £4.20
Code: CH0668B - 70mm id £7.60
Code: CH0668C - 100mm id £7.60
Code: CH0668D - 150mm id £8.00



I

J Retort Ring & Boss Combined

Strong circular mild steel ring with 8mm diameter stem. Open boss fitted with thumb screw to accept rods from 8mm to 12.5mm diameter.

Code: CH0672A - 50mm x 90mm Stem £8.50
Code: CH0672B - 75mm x 95mm Stem £8.75



J

**A****A****Channel Base**

Slotted base, finished in acid resistant coating with 40mm high jaws and fitted thumb screw. Designed for holding flat objects (e.g. manometers, boards, etc.), up to 34mm thick, in the vertical position.

Width: 95mm. Length: 75mm. Height: 60mm.
Weight: 1475g.

Code: C653**£13.00****B****B****Circular Tripod**

Circular tripod stand with 95mm dia. and height 70mm. Used with spirit lamps. Supplied without lamp.

Code: CH0643**£3.95****C****C****Stainless Steel Triangular Tripod**

200mm height x 125mm side length. Stainless steel triangular tripod with rubber feet.

Code: TRSTD200 - Pack of 10**£48.00****D****D****Cast Iron Triangular Tripod**

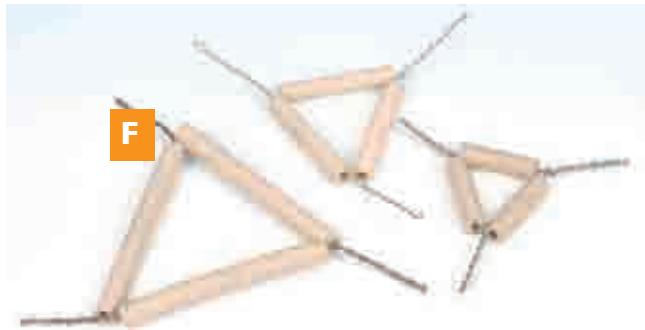
200mm tall with cast-iron triangular top, splayed steel legs and rubber feet.

Code: C645A - 125mm x 200mm**£4.00****Code: C645B - 150mm x 200mm****£4.50**

F Clay Pipe Triangles

Clay pipe tubes on thick iron wire.
50, 60 & 75mm pipe lengths.

Code: C530B - 50mm, Pack of 10	£4.75
Code: C530C - 60mm, Pack of 10	£5.25
Code: C530D - 75mm, Pack of 10	£6.25



G Laboratory Jack

Screw operated, scissor-action mechanism. Strong, stable support for laboratory equipment. Minimum height: 60mm. Maximum elevation: 250mm. Top plate: 150 x 135mm. Maximum load: 25kg.

Code: CH0642	£57.00
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H Magnetic Stirrer Bar

Code: 607-017 - 25 x 6mm, Pack of 10	£14.00
Code: 607-018 - 50 x 8mm, Pack of 10	£20.00



I Stirring Rods

Code: CH0755A - 150mm, Glass	£0.60
Code: CH0755B - 300mm, Glass	£0.75
Code: 772-003 - 250mm, Polypropylene	£1.50



**A****Plastic Bodied Magnetic Stirrer**

This magnetic stirrer offers superior stirrer capabilities without a high price tag. Measuring a compact 120 x 120mm, it takes up the minimum of bench top space (or fume cupboard space), whilst providing reliable and consistent stirring of liquid samples. This version is supplied complete with mains cable and plug.

The unit includes a Speedsafe® optical speed control feedback circuit which maintains a constant stirrer speed and limits the maximum speed to 1000rpm, even if the load is suddenly removed, thus preventing motor wear and providing a longer operational life.

Specification:

Min speed: 100rpm
Max speed: 1000rpm
Dimensions: 120 x 120 x 45mm
Weight: 640g
Power supply: Mains, 230V AC, 50-60Hz

Code: 607-015**£79.00****B****B****Mini Magnetic Stirrer, Round Base**

This series of magnetic stirrers are compact, lightweight and low-cost, yet include our Speedsafe® technology for greater control of stirring speed and motor protection. Measuring just 137mm diameter they are available in a range of colours to suit your mood, match your laboratory colour scheme or to differentiate between samples being stirred. The high specification includes an optical speed control feedback circuit which maintains a constant stirrer speed and limits the maximum speed to 1000rpm, even if the load is suddenly removed, thus preventing motor wear and providing a longer operational life. Comes complete with 25 x 7mm Stirrer Bar.

Specification:

Max stirring capacity: 1 Litre
Min speed: 100rpm
Max speed: 1000rpm
Dimensions (Diameter x H): 137 x 51mm
Weight: 640g
Power supply: Mains, 230V AC, 50-60Hz

Code: 607-006 - Yellow**£80.00****Code: 607-007 - Light Green****£80.00****Code: 607-008 - Light Blue****£80.00****Code: 607-009 - Olive****£80.00****Code: 607-010 - Green****£80.00****Code: 607-011 - Blue****£80.00****Code: 607-012 - Red****£80.00****Code: 607-013 - Grey****£80.00****Code: 607-014 - Ivory****£80.00**

C Rubber Stoppers

Constructed from high-quality, chemical resistant rubber. Stated dimensions are dia.1 x dia. 2 x L, respectively.

Code: CH0314A £1.35

- Solid, 9 x 11.5 x 20mm, Pack of 10

Code: CH0314B £1.45

- Solid, 11 x 14 x 24mm, Pack of 10

Code: C314-13 £1.55

- Solid, 13 x 16 x 24mm, Pack of 10

Code: C314-15 £1.65

- Solid, 15 x 18 x 24mm, Pack of 10

Code: CH0314E £2.35

- Solid, 17 x 20 x 26mm, Pack of 10

Code: CH0314F £2.45

- Solid, 18 x 21 x 26mm, Pack of 10

Code: C314-19 £2.50

- Solid, 19 x 22.5 x 28mm, Pack of 10

Code: C314-21 £2.75

- Solid, 21 x 24.5 x 28mm, Pack of 10

Code: CH0314I £3.50

- Solid, 23 x 24.5 x 28mm, Pack of 10

Code: CH0314J £4.50

- Solid, 25 x 28.5 x 28mm, Pack of 10

Code: CH0314K £5.50

- Solid, 27 x 31 x 32mm, Pack of 10

Code: CH0314L £5.95

- Solid, 29 x 33 x 32mm, Pack of 10

Code: C314-31 £7.50

- Solid, 31 x 36 x 35mm, Pack of 10

Code: CH0314N £8.95

- Solid, 33 x 38.5 x 38.5mm, Pack of 10

Code: CH0314A/1H £1.35

- 1 hole, 9 x 11.5 x 20mm, Pack of 10

Code: CH0314B/1H £1.45

- 1 hole, 11 x 14 x 24mm, Pack of 10

Code: RS13 £1.55

- 1 hole, 13 x 16 x 24mm, Pack of 10

Code: RS15 £1.65

- 1 hole, 15 x 18 x 24mm, Pack of 10

Code: CH0314E/1H £2.35

- 1 hole, 17 x 20 x 26mm, Pack of 10

Code: CH0314F/1H £2.45

- 1 hole, 18 x 21 x 26mm, Pack of 10

Code: RS19 £2.50

- 1 hole, 19 x 22.5 x 28mm, Pack of 10

Code: RS21 £2.75

- 1 hole, 21 x 24.5 x 28mm, Pack of 10

Code: RS23 £3.50

- 1 hole, 23 x 25.5 x 28mm, Pack of 10



Code: CH0314J/1H £4.50

- 1 hole, 25 x 28.5 x 28mm, Pack of 10

Code: CH0314K/1H £5.50

- 1 hole, 27 x 31 x 32mm, Pack of 10

Code: RS28 £5.75

- 1 hole, 28 x 33 x 32mm, Pack of 10

Code: CH0314L/1H £5.95

- 1 hole, 29 x 33 x 32mm, Pack of 10

Code: RS31 £7.50

- 1 hole, 31 x 36 x 35mm, Pack of 10

Code: CH0314N/1H £8.95

- 1 hole, 33 x 38.5 x 38.5mm, Pack of 10

Code: CH0314C/2H £1.55

- 2 holes, 13 x 16 x 24mm, Pack of 10

Code: CH0314F/2H £2.45

- 2 holes, 18 x 21 x 26mm, Pack of 10

Code: CH0314H/2H £2.75

- 2 holes, 21 x 24.5 x 28mm, Pack of 10

Code: CH0314I/2H £3.50

- 2 holes, 23 x 25.5 x 28mm, Pack of 10

Code: CH0314J/2H £4.50

- 2 holes, 25 x 28.5 x 28mm, Pack of 10

Code: CH0314K/2H £5.50

- 2 holes, 27 x 31 x 32mm, Pack of 10

Code: CH0314L/2H £5.95

- 2 holes, 29 x 33 x 32mm, Pack of 10

Code: CH0314M/2H £7.50

- 2 holes, 31 x 36 x 35mm, Pack of 10

Code: CH0314N/2H £8.95

- 2 holes, 33 x 38.5 x 38.5mm, Pack of 10

Assorted and Mixed Sets

Code: CH0315 £33.00

- Solid, Assorted Sizes, Pack of 50

Code: CH0316 £33.00

- 1 hole, Assorted Sizes, Pack of 50

Code: CH0317 £45.00

- 2 holes, Assorted Sizes, Pack of 50

Code: EDU921 £33.00

- Mixed Pack, Assorted Sizes, Pack of 67

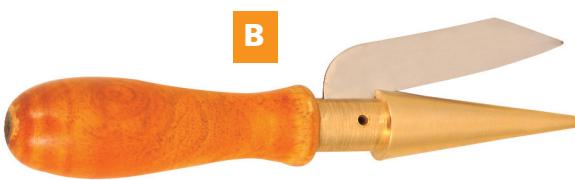
**A****A****Cork Borers**

Nickel plated brass. Variety of sizes, each with a cutting edge at bottom and handle at top. Complete with cleaning rod. Grip is good for easy use. Pipes are of a thick gauge material.

Code: C322A - 4-10mm, Set of 6 £27.00

Code: C322A - 4-18mm, Set of 12 £53.00

Code: C322A - 4-27mm, Set of 18 £79.00

**B****B****Cork Borer Sharpener**

Plated metal cone with polished wooden handle. Hinged cutter blade slotted to accept cutting blades. The edge is cut to the correct angle by depressing blade using thumb pressure. Borer diameter range: 4-27mm.

Code: C324 £12.00

**C****C****Plastic Syringes**

Disposable plastic syringes, graduated in 1ml increments.

Code: EDU884/A - 5ml, Pack of 100 £10.25

Code: 772-006 - 5ml, Pack of 10 £1.30

Code: EDU869 - 10ml, Pack of 100 £14.75

Code: 772-007 - 10ml, Pack of 10 £1.95

Code: EDU869A - 20ml, Pack of 100 £22.00

Code: 772-008 - 20ml, Pack of 10 £2.95

Code: EDU869D - 60ml, Pack of 100 £79.00

Code: 772-009 - 60ml, Pack of 10 £9.25

**D****D****Glass Syringe**

Ground glass, volume graduated to 100ml in 5ml increments.

Code: 251-402 £19.00

**E****E****Syringe Clamp**

Holder for 100ml gas syringe (code: 251-402). Dimensions: 320 x 50 x 153mm.

Code: 719-001 £30.00

F Tally Counter

Hand operated, counts up to 9999, with reset button.

Code: 776-010 £7.50



F

G Thermometer Stand

Aluminium stand, holds 18 thermometers.

Code: 772-002 £19.00



G

H LO-tox™ Thermometers

These new Brannan™ laboratory thermometers utilise LO-tox™, an organic filling specifically chosen to achieve a wide temperature span and provide the lowest practical levels of hazard. The quality and legibility make these an ideal substitute for mercury thermometers. These thermometers are fitted with Brannan™ anti-roll end caps with a ring to allow the thermometer to be suspended.

Features and specification:

- Low-toxic filling is easy to read
- Accurately calibrated against traceable standards
- 76mm immersion
- Blue anti-roll top and safety suspension ring
- Clear permanent markings

Code: 776-018 £2.75

- 305mm, -10 to 50 x 0.5°C, Blue Fill

Code: 776-019 £2.75

- 305mm, -20 to 110 x 1°C, Blue Fill

Code: 776-020 £2.75

- 305mm, -20 to 150 x 1°C, Blue Fill

Code: 776-021 £3.25

- 305mm, -10 to 260 x 1°C, Blue Fill

Code: 776-022 £3.65

- 305mm, -10 to 330 x 2°C, Brown Fill

H I



I Lab Thermometers

300mm are total immersion. 150mm partial immersion.

Code: 776-023 £1.85

- 300mm, -10 to 50 x 0.5°C, Green Fill

Code: 776-024 £1.30

- 300mm, -10 to 110 x 1.0°C, Green Fill

Code: 776-025 £1.85

- 300mm, -10 to 150 x 1.0°C, Green Fill

Code: 776-026 £1.55

- 150mm, -10 to 110 x 1.0°C, Red Fill

Code: 776-027 £2.00

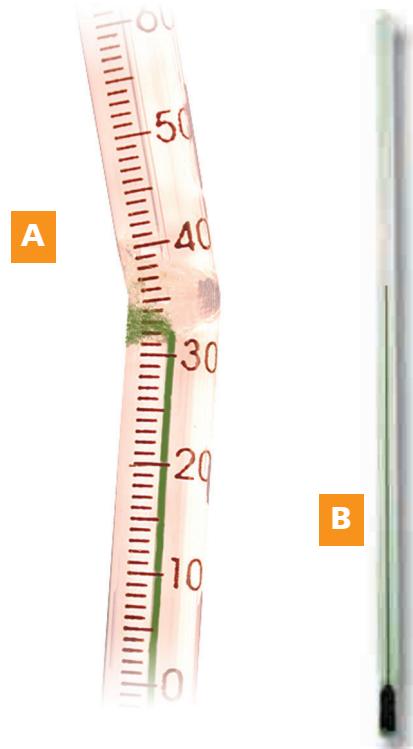
- 300mm, -10 to 110 x 1.0°C, Red Fill

Code: 776-028 £2.15

- 150mm, -10 to 110 x 1.0°C, Blue Fill

Code: 776-029 £2.25

- 300mm, -10 to 110 x 1.0°C, Blue Fill

**A****Breaksafe Thermometer**

The Brannan™ 'Breaksafe' Safety Thermometer is encapsulated in PVC to contain any glass or filling material in the event of breakage. 76mm immersion.

Code: 776-030**£4.80**

- 200mm, -10 to 110 x 1.0°C, Green Fill

B**Uncalibrated Thermometer**

These Brannan™ Uncalibrated Thermometers are made in the UK and designed for student calibration. An anti-roll device is moulded into the glass to prevent breakage, and the thermometers are supplied individually packed in sealed trays.

Code: 776-031**£3.40**

- 300mm, -10 to 110°C, Green Fill

C**Waterproof Electronic Test Thermometer**

Waterproof Electronic Test Thermometer with max/min memory function and 120mm stainless steel probe. Switchable between centigrade and fahrenheit. Supplied complete with battery, pocket case and clip.

Temperature Range: -50 to +150°C

Divisions: 0.1°C

Weight: 33g

Dimensions: 200 x 20 x 15mm

Accuracy:

-50 to -20°C: ±2°C; -21 to +120°C: ±1°C; +121 to +150°C: ±2°C

Code: 776-032**£15.00****D****Electronic Thermometer**

Versatile max/min electronic thermometer with memory. Instant, accurate reading for a wide range of applications.

Temperature range: (indoor) 0° to 50°C; (outdoor) -50° to 70°C

Resolution: 0.1°C

Freeze alert function

Large, clear digital display

Complete with stand and hanging slot

Size: 100 x 75 x 18mm.

2 x 1.5V batteries supplied.

Code: EDU1020**£15.00****E****Infra-Red Thermometer**

Hand held mini infrared thermometer with timekeeping function. Providing easy and safe non-contact measurement. LCD display has a resolution of 0.5°C and an accuracy ± 2.5°C. With 1.5V battery. Range: -22° to +110°C.

Code: EDU1023**£18.95****D****E**

F Crucible Tongs

General purpose tongs with corrugated jaws, used for the handling of hot apparatus.

Code: TBMS150	£15.00
- Mild Steel, 150mm Bowed, Pack of 10	
Code: TBMS200	£18.00
- Mild Steel, 200mm Bowed, Pack of 10	
Code: TBSS150	£30.00
- Stainless Steel, 150mm Bowed, Pack of 10	
Code: TBSS200	£30.00
- Stainless Steel, 200mm Bowed, Pack of 10	
Code: TSMS150	£15.75
- Mild Steel, 150mm Straight, Pack of 10	
Code: TSMS200	£17.00
- Mild Steel, 200mm Straight, Pack of 10	
Code: TSSS150	£30.00
- Stainless Steel, 150mm Straight, Pack of 10	
Code: TSSS200	£30.00
- Stainless Steel, 200mm Straight, Pack of 10	



F

G Beaker Tongs

Stainless steel, silicone-covered jaws can hold any beaker from 250ml to 1500ml. 360mm in length with a jaw width of 70mm.

Code: CH0738B	£42.00
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G

H Flask Safety Tongs

Stainless steel, with cork lined rectangular jaws giving an extremely firm grip on flasks of any size from 100 to 2000ml.

Code: CH0739	£40.00
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H



A Test Tubes

Borosilicate glass, standard wall thickness. With rim.

Code: EDU1014 £36.75

- 125 x 16mm, Pack of 100

Code: EDU1015 £49.00

- 150 x 24mm, Pack of 100

Code: EDU1016 £26.00

- 150 x 24mm, 1.2mm thick walls, Pack of 50

B Draining Rack

For drying test tubes, PVC coated.

Code: 704-002 £32.00

C Draining Basket

Made from polypropylene which is autoclavable.

Code: 712-030 - 400 X 400X 100mm £12.00

D Test Tube Baskets

This rack is made from polypropylene which is autoclavable. The rack is non corrosive and makes for easy handling and storage.

Code: 776-033 - 140 x 120 x 110mm £1.95

Code: 776-034 - 160 x 160 x 160mm £2.45

E Test Tube Holders

Aluminium test tube holder with sliding collar and wooden handle. Accepts tubes 15-25mm diameter.

Code: CH0727 - Pack of 10

£42.00



E

F Test Tube Holders

Plated, sprung steel wire test tube holder with finger grips. The jaws will accept tubes up to 40mm dia. and their alignment is maintained by a steel wire collar. Overall length: 16cm.

Code: CH0730 - Pack of 10

£7.75



F

G Test Tube Holders

Peg-type holder with spring for closing jaws. 180mm length, accepts tubes 11-19mm diameter.

Code: CH0726A - Pack of 10

£4.50



G

H Test Tube Holders

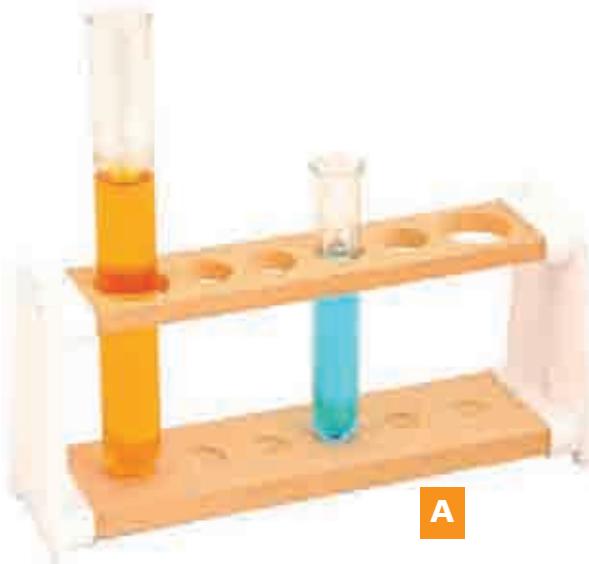
Test tube holder with strong spring clip with a strip of metal in wooden handle. To accept tubes 15 - 25mm dia.

Code: TTFR - Pack of 10

£31.00



H



A

Wooden Test Tube Stand

Polished wood stand with drilled holes of 20mm diameter each and clip-on polypropylene ends. Length: 230mm.

Code: EDU762 - 6-hole, Pack of 10 £44.00



B

B

Wooden Test Tube Stand

Polished wood stand with drilled holes of 20mm diameter each and clip-on polypropylene ends. Length: 400mm.

Code: EDU763 - 12-hole, Pack of 10 £50.00



C

C

Wooden Test Tube Stand

Constructed from wooden shelves which slot together with polypropylene ends. Six holes in the top section accept two 30mm diameter tubes and four 20mm diameter tubes. Height: 110mm.

Code: CH0702/PK10- 6-hole, Pack of 10 £49.00



D

D

Polythene Test Tube Stand

Polythene, autoclavable, with two parallel rows of holes along its length - 6 holes of 30mm diameter and 6 holes of 15mm diameter.

Code: CH0696 - 12-hole £5.00

E Polypropylene Test Tube Stand

White polypropylene autoclavable rack with six 25mm diameter holes. Rack ends supported by columns. Designed with six vertical pins for drying test tubes. Length: 235mm. Height: 90mm.

Code: CH0694B - 6-hole, Pack of 10 £40.00



E

F Z-shaped Test Tube Stand

Z shape made from 18-gauge aluminium sheet, anodised, with three tiers. Has an overall height of 75mm and length of 200mm. This stand has 5 holes of 28mm, 6 holes of 20mm and 8 holes of 13mm diameter.

Code: EDU160 - Pack of 10 £24.00



F

G Test Tube Rack

Coated wire test tube racks.

Code: 776-016 - 12 x 16mm holes £9.00

Code: 776-015 - 12 x 25mm holes £9.50



G



A

Delivery Tubes

Set of 4 glass delivery tubes, comprising:

- 1 x Short, straight 70mm length
- 1 x Long, straight 170mm length
- 1 x 90° bend with arms of 60mm and 160mm length
- 1 x 90° bend with both arms 60mm long

Code: C750 - 6mm dia., Set of 4**£6.50**

C

C

Rubber Tubing

Soft quality, resistant to acid and alkalis. 10 metre roll. Bore and wall thickness vary as indicated below.

- Code: C758-4 - 4mm bore, 1mm wall £6.00**
- Code: C758-5 - 5mm bore, 1.5mm wall £7.50**
- Code: C758-6 - 6.5mm bore, 1.5mm wall £8.50**
- Code: C758-7 - 7mm bore, 1.5mm wall £10.00**
- Code: C758-8 - 8mm bore, 2mm wall £12.00**
- Code: C758-10 - 10mm bore, 2mm wall £16.00**
- Code: C758-12 - 12mm bore, 2mm wall £18.00**



D

D

Rubber Tubing

Heavy duty high pressure tubing, red rubber. Supplied in 10m roll.

Code: CH0762D - 8mm bore, 4.5mm wall £58.00

E Translucent Silicone Rubber Tubing

Natural colour. Price is per metre length.

Code: 776-037 - 4.8mm bore, 1.6mm wall £3.89



E

F Hoffman Clips

Nickel-plated brass clip with projecting plate to prevent damage to tubing by end of screw. With hinged bottom bar for direct fitting and removal without access to ends of tube.

Code: CH0298B - 40mm, Pack of 10 £19.95



F

G Mohr Clips

Good quality, nickel-plated brass clips.

Code: CH0290B - Pack of 10 £14.50



G

H Watch Glasses

Clear, polished glass with ground edge.

Code: CH0554A - 50mm, Pack of 10 £2.60

Code: CH0554B - 60mm, Pack of 10 £2.75

Code: CH0554C - 75mm, Pack of 10 £2.85

Code: CH0554 - 80mm, Pack of 10 £3.50

Code: CH0554D - 90mm, Pack of 10 £4.00

Code: CH0554E - 100mm, Pack of 10 £4.95

Code: CH0554F - 125mm, Pack of 10 £9.95

Code: CH0554G - 150mm, Pack of 10 £13.00



H

I Circular Adjustable Water Baths

Stainless steel Gas Bath - Suitable for use with hotplate or gas burner, the steam produced from bath provides an effective source of constant heat for samples that otherwise could be thermally damaged by a naked flame. Supplied with a set of rings to vary the diameter of the bath aperture.

Code: 603-051 - 125 x 90mm £39.00

Code: 603-052 - 152 x 102mm £46.00

Code: 603-053 - 203 x 127mm £49.00



I



2 Plus



A

2S Plus



5 Plus



12 Plus



18 Plus



26 Plus

A

'Aqua' Analogue Water Baths

JB Aqua water baths offer the simplicity of an analogue bath, with the quality and reliability expected in a Grant water bath. Blue transparent polycarbonate lid and polycarbonate base tray are included as standard to improve performance and limit energy wastage.

Ambient + 5°C to 98°C

User settable, over-temperature cutout - when sample has critical maximum temperature

Fixed thermal cutout - protects the user if the bath is accidentally run without water or in the very unlikely event of failure of both control systems

Simple dial temperature setting - easy to use and provides quick visual indication of temperature and ability to re-set dial position

Code: 603-017 - Model: 2 Plus	£299.00
Code: 603-018 - Model: 2S Plus*	£299.00
Code: 603-019 - Model: 5 Plus	£329.00
Code: 603-020 - Model: 12 Plus	£390.00
Code: 603-021 - Model: 18 Plus	£489.00
Code: 603-022 - Model: 26 Plus	£555.00

Aqua and Sub Aqua Dimensions

Model	Aqua & SubAqua	2 Plus	2S Plus*	5 Plus	12 Plus	18 Plus
Capacity (Litre)		2	2	5	12	18
Volume l/w/d (mm)		125/140/115	145/290/30*	145/290/115	315/290/115	495/290/115
Drain tap (Yes/No)		N	N	N	Y	Y
Model	Aqua & SubAqua	26 Plus	34 Plus	Dual		
Capacity (Litre)		26	34		5 & 12	
Volume l/w/d (mm)		495/290/165	630/290/160		145/290/115+ 315/290/115	
Drain tap (Yes/No)		Y	Y			

* 'S' models have shallower depth and are ideal for microtube use.



B

B

'Aqua Dual' Analogue Water Bath

The JB Aqua Dual Plus bath offers the simplicity of an analogue bath, with the quality and reliability expected in a Grant water bath. When two temperatures are needed and space is of primary concern, the dual bath (5L and 12L) is the answer. Blue transparent polycarbonate lid and polycarbonate base tray are included as standard to improve performance and limit energy wastage.

Ambient + 5°C to 98°C

User settable, over-temperature cutout - when sample has critical maximum temperature

Fixed thermal cutout - protects the user if the bath is accidentally run without water or in the very unlikely event of failure of both control systems

Simple dial temperature setting - easy to use and provides quick visual indication of temperature and ability to re-set dial position

Code: 603-023**£625.00**



2 Plus



2S Plus



5 Plus



12 Plus



18 Plus



26 Plus



34 Plus

C 'Sub Aqua' Digital Water Baths

High quality and excellent temperature stability, in a value-for-money package. The SUB Aqua digital water baths are perfect for smaller volume applications. Polycarbonate lid and base tray is included as standard.

Ambient + 5°C to 99°C (stability $\pm 0.2^\circ\text{C}$)

Three programmable temperature presets - allows commonly used temperatures to be quickly selected

Front panel lock-out - disables front panel controls and prevents settings being accidentally changed

Countdown timer with audible buzzer

Fixed thermal cutout - protects the user if the bath is accidentally run without water or in the very unlikely event of failure of both control systems

User settable, over-temperature sample protection

Digital PID control for quick heat-up and precision control

Code: 603-024 - Model: 2 Plus	£445.00
Code: 603-025 - Model: 2S Plus*	£445.00
Code: 603-026 - Model: 5 Plus	£479.00
Code: 603-027 - Model: 12 Plus	£549.00
Code: 603-028 - Model: 18 Plus	£585.00
Code: 603-029 - Model: 26 Plus	£645.00
Code: 603-030 - Model: 34 Plus	£989.00

D 'Sub Aqua Dual' Digital Water Bath

When two temperatures are needed and space is of primary concern, the dual (5L and 12L) bath is the answer. Blue transparent polycarbonate lid and polycarbonate base tray are included as standard to improve performance and limit energy wastage

Excellent temperature stability of $+0.2^\circ\text{C}$

Three programmable temperature presets - allows commonly used temperatures to be quickly selected

Front panel lock-out - disables front panel controls and prevents settings being accidentally changed

Countdown timer with audible buzzer

Fixed thermal cutout - protects the user if the bath is accidentally run without water or in the very unlikely event of failure of both control systems

User settable, over-temperature sample protection

Digital PID control for quick heat-up and precision control throughout the temperature range

Code: 603-031 - Model: 26 Plus	£849.00
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D

**A****Grant PB1 Analogue Water Bath**

A simple and compact unstirred waterbath with a transparent polycarbonate tank and an analogue control unit. It is ideal for educational purposes, routine laboratory purposes, procedures requiring visibility of reactions inside the vessels and as a 'personal' water bath for scientists needing a small working area with a compact footprint

20 to 60°C operation

Stability $\pm 0.3^\circ\text{C}$

Simple to use analogue control

Removable control unit with simple to use analogue temperature setting dial

Clear polycarbonate tank for easy visibility of reactions within the vessels

Perforated tray to mix the liquid by convection and enhance the performance

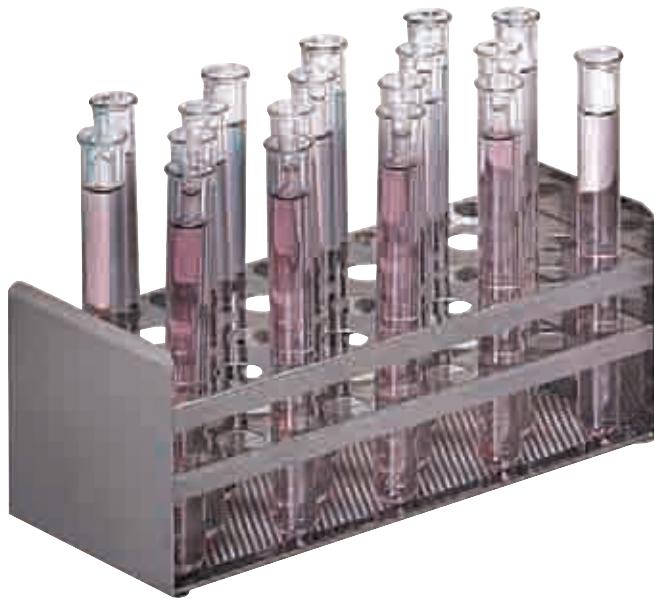
Optional gabled lid (LP1) to prevent evaporation of liquid and avoid contamination of samples

User-resettable over-temperature cut-out for confidence that equipment and workplace are protected

Choice of racks to accommodate tubes with 13, 16 and 19 mm diameter

Code: 603-032

£335.00



B **C**

B**PB1 Test Tube Racks**

Stainless steel racks for PB1 test tubes.

Code: 603-033 - 12 x 13mm tubes **£49.00**

Code: 603-034 - 10 x 16mm tubes **£49.00**

Code: 603-035 - 9 x 19mm tubes **£49.00**

C**Aqua & Sub Aqua Plus Test Tube Racks**

Stainless steel racks for PB1 test tubes.

Code: 603-036 - 84 x 10mm tubes **£59.00**

Code: 603-037 - 55 x 13mm tubes **£59.00**

Code: 603-038 - 36 x 16mm tubes **£59.00**

Code: 603-039 - 32 x 19mm tubes **£59.00**

Code: 603-040 - 18 x 25mm tubes **£59.00**

Code: 603-041 - 12 x 30mm tubes **£59.00**

D Clifton Analogue Thermostatic Baths

These Clifton analogue water baths are designed for general use and are economically priced without compromising quality. For temperatures above 60°C a lid is recommended. This range of baths will operate at 100°C but are not designed for continuous boiling and NE1B range is recommended.

Features

Temperature control

Temperature range ambient +5°C to 100°C, thermostat control. Controls feature an illuminated on/off switch, heater on" indicator and temperature dial. Every water bath is calibrated at the factory at 45°C for consistent temperature control in use.

Heating

Heating element, safety cut-out and temperature sensors concealed underneath tank providing a totally clear 'clutter free' working area making it also easy to clean.

Construction

Stainless steel 304 spec bath contained within a sturdy body. Body powder-coated paint finish having good chemical and detergent resistance. Anti-bacterial paint finish that inhibits the growth of bacteria. Easy clean controls. Side lifting handles for ease of transportation.

Stainless steel perforated false base

Stainless steel perforated removable base. Clifton 'low height' shelf maximises working height in the tank.

Drain outlet

Larger water baths (22 & 28 litre) have a large bore drain outlet, accessory tap can be fitted for convenience.

Accessories

Accessories available including racks and lids, recommended above 60°C.

Specification

Carries CE mark. Designed and manufactured in the UK.

Warranty: 3 Years

Service and support: in the UK.

Power supply: Mains 230V AC 50-56Hz.

Option of 120V AC 50-60Hz models Safety Class: 1

Temperature range: Ambient +5°C to 100°C

Sensitivity/stability: @45°C : ±0.5°C

Internal Dimensions (W x D x H):

2.5L - 230 x 130 x 150mm

4L - 300 x 150 x 150mm

8L - 300 x 240 x 150mm

14L - 325 x 300 x 150mm

22L - 500 x 300 x 150mm

28L - 500 x 300 x 200mm

External Dimensions (W x D x H):

2.5L - 270 x 190 x 240mm

4L - 332 x 185 x 290mm

8L - 332 x 270 x 290mm

14L - 361 x 332 x 290mm

22L - 538 x 332 x 290mm

28L - 538 x 332 x 290mm

Code: 603-042 - 2.5L	£272.00
Code: 603-043 - 4L	£283.00
Code: 603-044 - 8L	£311.00
Code: 603-045 - 14L	£332.00
Code: 603-046 - 22L	£396.00
Code: 603-047 - 28L	£431.00



E Polypropylene Spheres

Polypropylene Spheres provides a blanket of hollow spheres to reduce thermal losses, saving energy.

Code: 603-063	£31.00
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A 4L model



A 14L model



A 22L model

A

Clifton Digital Thermostatic Baths

These water baths provide a stable temperature environment ideal for meeting quality control requirements. Featuring digital PID temperature control with Smart adaptive control technology for accurate working temperatures and reproducible set values. Featuring auto alarm settings, illuminated on/off switch, heater and over and under temperature indicators. Every water bath is factory calibrated with a UKAS measuring system.

Features

Temperature control

Continuous 'Adaptive Tuning', to constantly refine the control liquid temperature at a set value. Clearly visible LED display to 0.1°C resolution. Settings retained in memory.

Heating

Heating element, safety cut-out and temperature sensors concealed underneath tank providing a totally clear 'clutter free' working area which is easy to clean. The heating footprint covers the base of the tank, its low mass providing rapid energy transfer, quicker heat-up times and uniformity because heat is spread over a broad area.

Status indication

Clearly visible indication of heating and over temperature alarm.

Construction

Stainless steel 304 spec bath contained within a sturdy body. Body with powder-coated anti-bacterial paint finish has good chemical and detergent resistance. Control panel has good detergent and chemical resistance and is easy to wipe clean

Stainless steel perforated false base

Removable 'Low Height' shelf maximizes working height in tank. Corrosion resistant stainless steel working environment

Drain outlet

Larger water baths (22 a& 28 litre) have a large bore drain outlet, accessory tap can be fitted for convenience.

Accessories

Accessories available including racks and lids, recommended above 60°C.

Specification

Temperature range: ambient +5°C - 99°C.

Sensitivity/temperature stability @ 45°C: ±0.2°C

Uniformity: ±0.1°C.

Tank, immersed components: 304 spec (18/8) stainless steel, crevice-free.

Power Supply: Mains 230V AC, 50-60Hz, 400W

Warranty: 3 years

Safety class: 1

Temperature setting/control: Splash-proof controls/Keypad setting/Digital LED display/PID temperature control.

Temperature display resolution: Real-time, fast responding display of actual measured temperature in increments of 0.1°C.

Carries the CE mark, meeting the requirements of Low Voltage and EMC Directives.

Internal Dimensions (W x D x H):

4L - 300 x 150 x 150mm

8L - 300 x 240 x 150mm

14L - 325 x 300 x 150mm

22L - 500 x 300 x 150mm

28L - 500 x 300 x 200mm

External Dimensions (W x D x H):

4L - 332 x 185 x 290mm

8L - 332 x 270 x 290mm

14L - 361 x 332 x 290mm

22L - 538 x 332 x 290mm

28L - 538 x 332 x 290mm

Code: 603-001 - 4L

£415.00

Code: 603-002 - 8L

£425.00

Code: 603-003 - 14L

£460.00

Code: 603-004 - 22L

£495.00

Code: 603-005 - 28L

£545.00

B Hinged Gable Lids

Hinged gable lid for use with unstirred water bath codes 603-001 to 603-005.

Code: 603-006 - 4L	£49.00
Code: 603-007 - 8L	£49.00
Code: 603-008 - 14 & 18L	£49.00
Code: 603-009 - 22 & 28L	£49.00



B

C Flat Stainless Steel Lids

Suitable for when a Clifton water bath is 'not in use', with this lid fitted it prevents contamination of liquid from air-borne particles - dust cover. Can also be useful when a Clifton water bath is 'in use', minimizing heat loss, saving energy, and assisting to maintain bath temperature ready for the next application. Fitted with an insulated handle.

Code: 603-054 - 2.5 & 4L	£39.00
Code: 603-055 - 8L	£42.00
Code: 603-056 - 14L	£43.00
Code: 603-057 - 22 & 28L	£45.00



C

D Stainless Steel Test Tube Racks

Stainless Steel Test Tube Rack 26 Holes x 17mm dia.
Maximum number of racks per baths:
4 litre = 1 rack, 8 litre = 2 racks, 14 litre = 4 racks, 22/28 litre = 6 racks.
NB. code 603-061 is also suitable for 1.5ml microtubes.

Code: 603-058 - 26 x 17mm tubes	£37.00
Code: 603-059 - 16 x 26mm tubes	£37.00
Code: 603-060 - 36 x 13mm tubes	£37.00
Code: 603-061 - 18 x 19mm tubes	£37.00
Code: 603-062 - 12 x 32mm tubes	£37.00



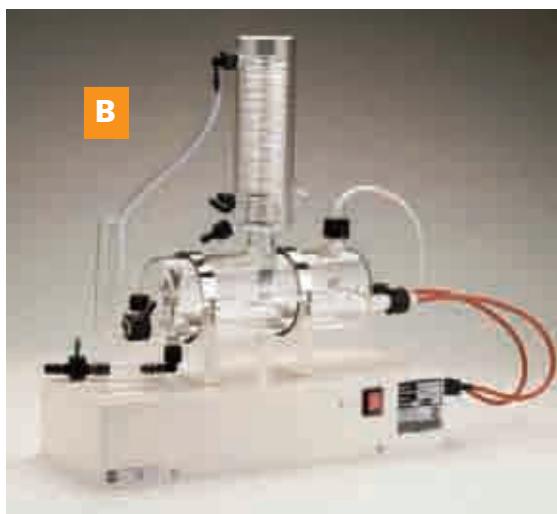
D

**A Water Still**

A budget still designed to meet educational requirements at a low cost. This still produces 4 litres per hour with a 3kW metal heating element. Thermostatic cut off.

Code: 612-015

£629.00

**B Silica Heater Water Still**

An economy still, producing four litres of pyrogen-free distillate per hour with two 1.5kW silica heating elements. Thermostatic cut off and pressure switch.

Code: 612-016

£895.00

**C Vertical Water Still**

A traditional vertical water still, producing 4 litres per hour with a 3kW metal heating element. Thermostatic cut off. A double spiral condenser mounted on a spherical boiling chamber with a flexible joint. Water flow is controlled by a constant level device. Supplied with a metal bracket for wall mounting or bench mounting.

Code: 612-017

£765.00

SAFETY

D Safety Aprons

Pack of 100 soft polyethylene disposable aprons.

Code: 712-002 - Pack of 100 £6.95



E PVC Apron

Heavy duty PVC apron with detachable straps.

Code: 613-007 £7.50



F Polythene Safety Gloves

Non-sterile, disposable polythene.

Code: POLYM - Medium, Pack of 100 £1.75



G Vinyl Safety Gloves

Non-sterile, disposable vinyl.

Code: ECVS - Small, Pack of 100 £4.50

Code: ECVM - Medium, Pack of 100 £4.50

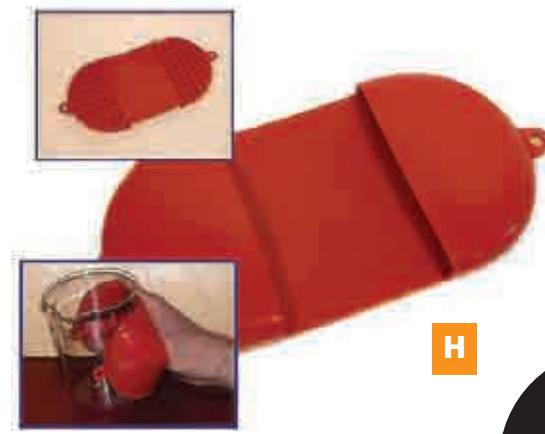
Code: ECVL - Large, Pack of 100 £4.50



H Silicone Safety Gloves

Silicone rubber with inserts for fingers and thumb.
Fits any size. Protects between -30°C and 260°C.

Code: 712-003 £37.00



Safety



A

Safety Lab Coat

White polyester/cotton mix, with one breast pocket and two side pockets. Sizes: S, M, L & XL.

S = Chest: 113cm; Arm length: 55cm; Length: 90cm.

M = Chest: 116cm; Arm length: 58cm; Length: 96cm.

L = Chest: 122cm; Arm length: 59cm; Length: 99cm.

XL = Chest: 126cm; Arm length: 61cm; Length: 103cm.

Code: 712-001A - Small £19.00

Code: 712-001B - Medium £19.00

Code: 712-001C - Large £19.00

Code: 712-001D - Extra Large £19.00

B

Safety Goggles

Polycarbonate safety goggles with adjustable strap.

Code: EDU1005 £2.05

C

Safety Spectacles

Comfortable, lightweight polycarbonate safety spectacles.

Code: EDU652 £2.70

D

Eyewash Pack

Sterile, single-use eyewashes.

Code: 613-005 - Pack of 24 £23.00

E

Double Eyewash Station

The double eyewash station includes 2 x 500ml eyewash solutions with eyepads and comes in a wall mountable carry case.

Code: 613-006 £31.00

Code: 613-023 - 500ml replenishment £5.25

F Emergency First Aid Kit

10 person first aid kit includes:
 20 assorted plasters; 2 sterile eyepads; 4 triangular bandages; 6 medium dressings; 2 large dressings; 1 pair of disposable gloves; 6 safety pins; 10 antiseptic wipes; a wall bracket and some first aid guidance notes.

Code: FA25

£45.00



F

G Fire Blanket

Wall-mountable, 1 metre square.

Code: FSEPR

£20.00



G

H Hazard Warning Tape

Self-adhesive vinyl roll, 66 metres long x 25 mm wide.

Code: 613-027 - Toxic	£6.50
Code: 613-028 - Corrosive	£6.50
Code: 613-029 - Flammable	£6.50
Code: 613-030 - Harmful	£6.50
Code: 613-031 - Oxidising Agent	£6.50
Code: 613-032 - Biohazard	£6.50
Code: 613-033 - Irritant	£6.50
Code: 613-034 - Explosive	£6.50
Code: 613-035 - Poison	£6.50

H



I Spill Pack

The Spill Pack is made up of six containers each with enough absorbent material to absorb a spillage of up to 500cm, the maximum volume recommended for storage in a laboratory. In addition to the absorbent material, two packets of soda ash are provided so that acid spills, once absorbed and collected, can be neutralised and made safe for disposal. Instruction sheet included.

Code: 613-026

£39.95



I



A Acid Spill Clean Up Kit

Kit contains:

Instruction sheet/MSDS; 2 vinyl exam gloves; 4 empty 225 x 400mm polybags; 4 twist ties; 4 blank shipping tags; 1 dustpan and brush; 1 bag vermiculite absorbant; 1 bag neutralising mixture (Calcium Hydroxide, Sodium Carbonate, Calcium Carbonate & Litmus Powder).

Code: 613-003

£72.00



B Caustic Spill Clean Up Kit

Kit contains:

Instruction sheet/MSDS; 2 vinyl exam gloves; 4 empty 225 x 400mm polybags; 4 twist ties, 4 blank shipping tags; 1 dustpan and brush; 1 bag vermiculite absorbant; 1 bag neutralising mixture (Citric Acid, Anhydrous & Litmus Powder).

Code: 613-002

£69.00



C Solvent Spill Clean Up Kit

Kit contains:

Instruction sheet/MSDS; 2 vinyl exam gloves; 2 empty 225 x 400mm polybags; 2 twist ties; 2 blank shipping tags; 1 dust pan and brush; 1100g diatomaceous earth in 225 x 400mm polybag.

Code: 613-001

£69.00



D Bench Mats

Calcium silicate, asbestos-free bench mats with well-finished edges. Packed in sturdy cartons.

Code: EDU1008 - 150x150mm, Pack of 10 £5.75

Code: EDU1009 - 230x230mm, Pack of 10 £10.25

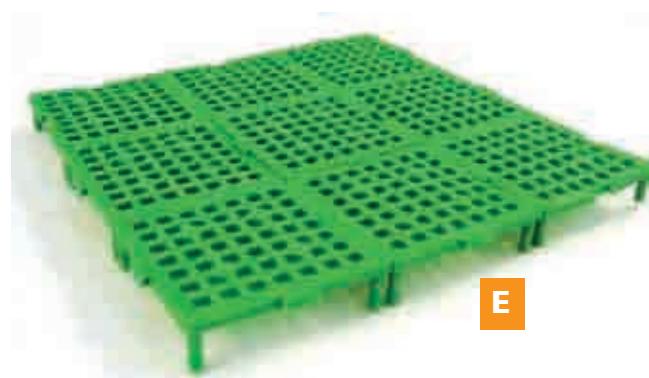
Code: EDU1010 - 300x300mm, Pack of 10 £11.75

E Sinksafe Glassware Protection Mats

Sinksafe is composed of 50mm square modular units which can be connected together to form a platform to cover the base of any sink. It provides a firm cushion to break the fall of glassware and thus prevent loss of equipment. The mesh design allows the unhindered passage of liquids, and the small contact area of the legs prevents retention by capillarity of chemical solutions. The polypropylene construction is suitably chemical-resistant. When used in school laboratories not only is there a cost saving on every occasion a breakage is prevented, but there are also the important safety benefits of avoiding broken glass in the sink or mercury spillage from thermometers.

Code: 613-004 - Pack of 20

£11.00



E

F Safety Screen

Transparent polycarbonate safety screen comprising central panel and two side panels connected with hinges. Overall height is 610mm. Section widths are 225, 300 and 225mm. 4mm thick.

Code: EDU994

£59.00



F

G Laboratory Safety Screen

A robust and stable safety screen with excellent optical clarity, constructed from clear PET-G high impact material. The screen stands 60cm high, with three fixed-angle panels 18, 24 and 18cm wide, respectively. All the corners are smoothly rounded to prevent accidental injury caused by sharp points.

Code: 613-024

£67.00



G

**A****Hazardous Storage Cabinets**

Designed to meet the requirements of COSHH regulations for safe storage of flammable liquids and chemicals. Bright yellow with warning signs. 0.9mm thick steel. Adjustable, perforated galvanised shelf. Removable galvanised sump. Cabinet has one shelf.

Model Size:(H x W x D)

One Doored - 915 x 455 x 455mm.

Two-Doored - 710 x 915 x 455mm

Two-Doored, Large - 915 x 915 x 455mm

Code: 613-010 - One-Doored £195.00

Code: 613-011 - Two-Doored £245.00

Code: 613-012 - Two-Doored, Large £275.00

B**Hazardous Storage Cabinet**

Designed to meet the requirements of COSHH regulations for safe storage of flammable liquids and chemicals. Bright yellow with warning signs. 0.9mm thick steel. Adjustable, perforated galvanised shelf. Removable galvanised sump. Cabinet has three shelves. Two-doored. Model Size:(H x W x D) 1830 x 915 x 455mm.

Code: 613-013 - Two-Doored, Vertical £399.00

C**Hazardous Storage Chest**

Designed to meet the requirements of COSHH regulations for safe storage of flammable liquids and chemicals; this sloping-topped chest is bright yellow with warning signs and is constructed from 1.6mm steel with a liquid-tight base and a hasp and staple for padlocking. Size (H x W x D): 610 x 915 x 455mm.

Code: 613-014 £262.00

D**Storage Cabinet Stand**

Stand for horizontal hazardous storage cabinet or chest. Suitable for 613-011, 613-012 and 613-014. Size (H x W x D): 455 x 915 x 455mm.

Code: 613-020 £62.00

E Airone 1000R Fume Cupboard

Fixed, filtered fume cupboard for classrooms & prep-rooms.

Features and Specification:

Tested & certified to BS:7989:2001
 Epoxy-coated mild steel construction (RAL 7035)
 Counterweighted sliding glass sash front
 Laminated safety glass side windows
 Automatic face velocity adjustment (VAV)
 Digital control system
 365mm high front opening, set by stops
 Filtrete electrostatic particle filter
 Solid grade laminate back baffle
 Built-in fluorescent lights
 External dimensions (W x D x H): 1000 x 760 x 2200mm

Includes:

Polypropylene worktop with vulcathene drip cup
 Remote water & gas services
 Single electrical socket
 Plain stand included
 22kg CMS carbon filter, size RS

Code: 613-017

£4,495.00

E



F Airone 1200R Fume Cupboard

Fixed, filtered prep-room fume cupboard.

Features & Specification as code 613-017 except:

External dimensions (W x D x H): 1200 x 760 x 2200mm

Includes:

Polypropylene worktop with Sink
 Double electrical socket
 Plain stand included
 Two 15kg CMS carbon filters, size B

Code: 613-018

£5,400.00

F

Shown with
optional storage
cabinet 613-025



Due to the size and weight of these items,
bulk carriage charges may be necessary.
Please contact for details when ordering.

Safety



C



B



A

A

Airone 1000RS Fume Cupboard

School spec, mobile filtration fume cupboard.

Features and Specification:

Tested & certified to BS:7989:2001

Complies with Building Bulletin 88

Tested by CLEAPSS

Epoxy-coated mild steel construction (RAL 7035)

Counterweighted sliding glass sash front

Laminated safety glass side and rear windows

360 degree visibility

Fully mobile with front lockable castors

2-Speed fan control

365mm high front opening, set by stops

Filtrete electrostatic particle filter

Storage cupboard included

External dimensions (W x D x H): 1000 x 700 x 1850mm

Includes:

Polypropylene work tray with vulcathene drip cup

Remote water & gas services

Single electrical socket

22kg CMS carbon filter, size RS

Code: 613-021

£4,450.00

B

Vented Storage Cabinet, 1100mm

Optional accessory for Airone 1200R. Storage cabinet fits under the fume cupboard stand. Shown in picture of 613-018. 110mm wide.

Code: 613-025

£325.00

C

Airone 1000RS/DS Docking Station

Docking Station for Airone 1000RS/DS

Features and Specification:

Epoxy-coated mild steel construction

Specifically designed for use with Airone 1000RS & Airone 1000DS
Lockable, sturdy construction to securely lock away water, waste and gas when not in use

Quick-release connections to water, waste and gas

Externally accessible 13A electrical socket

Easily sited and recess or flush fitted

Fume cupboard tether point to prevent damage to service connections

Code: 613-015

£325.00

STORAGE

D Gratnell Trays

Shallow, Deep and Jumbo size Gratnell Trays.

Dimensions:

Shallow	- 427 x 312 x 75mm
Deep	- 427 x 312 x 150mm
Jumbo	- 427 x 312 x 300mm

Code: F/1B - Shallow, Blue	£2.20
Code: F/1G - Shallow, Green	£2.20
Code: F/1R - Shallow, Red	£2.20
Code: F/1Y - Shallow, Yellow	£2.20
Code: F/2B - Deep, Blue	£3.20
Code: F/2G - Deep, Green	£3.20
Code: F/2R - Deep, Red	£3.20
Code: F/2Y - Deep, Yellow	£3.20
Code: F/3B - Jumbo, Blue	£4.95
Code: F/3G - Jumbo, Green	£4.95
Code: F/3R - Jumbo, Red	£4.95
Code: F/3Y - Jumbo, Yellow	£4.95



E Lid for Gratnell Trays

Translucent clip-on lid to fit all sizes of Gratnell Tray.

Code: LF1	£2.10
------------------	--------------



Surcharges may apply.

Storage



A

Trolley for Gratnell Trays

Trolley for Gratnell Trays. Fitted with heavy duty 75mm castors fitted into solid steel blocks for extra strength. The recessed top is removable, with open corners for easy cleaning. Dimensions: 710 x 420 x 850mm. Capacity: 12 shallow Gratnell trays (not included). Other size trolleys available - please enquire for full details.

Code: 2025Q

£199.00

B

Runners for Gratnell Trolley

Pair of metal runners to fit Gratnell storage trolley

Code: G3

£4.20

C

Laboratory Trolley

Heavy duty trolley with heavy duty metal castors, rubber tyre wheels and foot release brakes. Three adjustable shelves with spill protection lip. Supplied flat packed. No nuts or bolts - slots together.

Assembled dimensions:

H 113cm x L 104cm x W 43cm

Shelf dimensions: 99cm L x 42cm W

Code: 612-002

£169.00

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Bromothymol Blue 0.5%	
Calcium Chloride	
Congo Red	
Cresol Red	
Crystal Violet 0.1%	
Crystal Violet 1%	
Eosin Y	
Magnesium Nitrate	
Malachite Green	
Methyl Orange	
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1. All contracts for the supply of goods ("Goods") by EDU-LAB Ltd to a customer ("the Purchaser") will be subjected to the following terms and conditions and in dealing with EDU-LAB Ltd the Purchaser accepts that these terms and conditions shall apply to any Contract between the parties in preference to the Purchaser's own terms and conditions (if any). Interpretation of these terms and conditions and any contract to which they shall apply shall be governed by English Law.

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- 3.2 to take account of changes in manufacturers' costs or other costs between quotation and delivery.

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